

EXCLUSIVE: REEDY'S REBUILDABLE STOCK!

AirAGE

# Radio Control CAR ACTION

THE WORLD'S LEADING R/C CAR MAGAZINE

June 1999

FIRST LOOKS

THUNDER TIGER **EB-4**

YOKOMO **MR-4 RALLY**

**DUAL-ENGINE  
MONSTER  
67  
MPH!**



TESTED

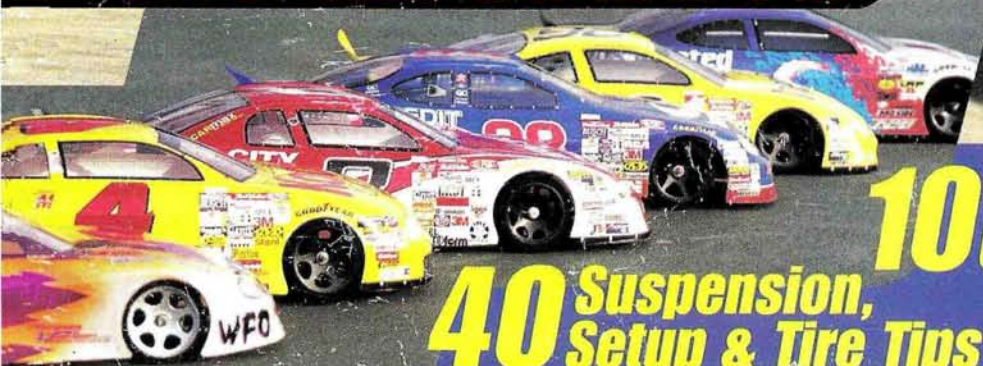
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**ON THE COVER** (from top): Reedy Rage Type R rebuildable stock motor; Greg Vogel's Project Dual-Engine USA-1; a lineup of racers from the Oval Car Guide.



## A Letter from the Oval Office ...

... No, not Bill Clinton's inner sanctum, but my office, which is now known as the Oval Office because it's swimming in the latest high-end chassis for oval racing. From Associated to Wood Racing, they're all here. How else could we have produced this issue's **1/10-Scale Oval Car Guide**? If you've been

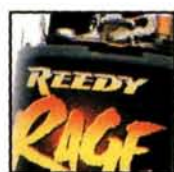


waiting for a big dose of R/C oval action (and I know you have), this month is your month. In addition to all the facts and specs on eight of the hottest LTO cars, we also have everything you ever wanted to know about oval tuning (and sure weren't afraid to ask) wrapped up in **Oval Tuning Basics**,

courtesy of Steve Pond along with a hand (or two Hands, as it were) from that dynamic duo of ovaldom, Kirby and Ryan Hand of Team Trinity.

In a decidedly different R/C realm, this issue brings you the completion of Greg Vogel's highly anticipated project truck in **Project Double Trouble USA-1, Part 2**. For the eight of you who are still reading this instead of flipping directly to the article, I'll let you know that yes, it really does run, and yes, it is fast. Way fast.

Another car that's sure to be way fast is the **Thunder Tiger EB-4** 1/8-scale buggy—the Tiger's first crack at an all-out total competition design. We have the hot scoop on this bad boy; as a matter of fact, we had to promise to shoot our sample car within 24 hours and then ship it directly to factory driver Billy Easton! Maybe we should have called the article "Inside Billy Easton's EB-4."



Can't get enough new stuff? We have a complete teardown on the **Reedy Rage Type-R** rebuildable stock motor. Actually, "complete" doesn't do this article justice; "exhaustively researched" is more like it. Author Steve Pond went nuts on this one; you'll dig it.

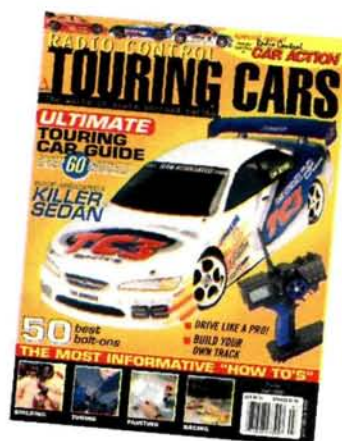
Awright; enough prattle from me. There's a lot to digest in this issue. I know you want to get to it!

*Peter Vieira*

Peter Vieira

Editor

*Whoa; check this out! The 1999 edition of Radio Control Touring Cars hits the newsstand ... now! From track building to chassis tuning to body painting, it's the world of sedan and rally cars at your fingertips. Get yours now!*



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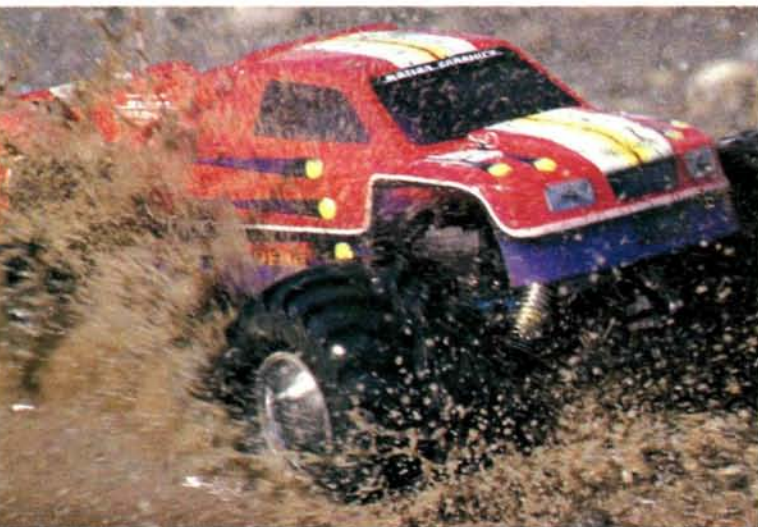
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## Kit Or Custom?

I am a new subscriber, and there are no words to describe how much your magazine rocks! Here's my problem, if you can really call it that: for the past couple of years, I have been a faithful Traxxas off-road nitro owner and considered only Traxxas vehicles, but after reading your article on the OFNA Monster Blazer, I quickly changed my mind. The opening photo of the truck racing through a mud puddle gets my heart pounding! I am absolutely determined to own one, and I have looked through the entire magazine and all of my Tower Hobbies catalogs, but I just can't find one. I did find a Blazer SST. Is this what you started with and just put huge (what look to me like USA-1) tires and rims on it, or am I just too impatient and the model is not advertised yet? If it is just a Giant Blazer SST, could you tell me which parts you used to create this awesome machine, and if possible, the cost of each? Finally, which type of Futaba servos would you recommend to control this beast? [email]  
GREG CORSON

The Monster Blazer is a complete kit, not a Blazer SST conversion. Ironically, it's based more on the Ultra GT than the Blazer! The truck appears in OFNA's ad on pages 58 and 59 of the May issue. I think Tower Hobbies will have them in stock by now, even if they aren't in the Tower ad yet. Your local hobby shop could also order one for you. I suggest you use

Futaba's strongest servo—the S9402. You should also get a strong throttle/brake servo to stop the truck, but it's OK to skip here if you blow your budget on a powerful steering servo. Just be sure to leave yourself plenty of room to stop! —Pete

## Calling Wonder Woman

I would like to send you a picture of my car, but it's invisible—except for the spur gear, that is. For some reason, I had a hard time finding an invisible spur gear. Anyway, I have a hell of a time getting my car around the track, and the club guys say I look silly. Can you give me any advice? If you can't, I think I'll sell the thing. Anybody know Wonder Woman's phone number?  
RANDY HECOX  
Columbia, TX

Randy, glue is for building models, not sniffing. —Pete

## Speed Freak

I love your magazine, and I have a question. Which motor/gear do you recommend for my Associated T3 to make it go as fast as possible?  
KRIS WILSON  
Moreno Valley, CA

Check your manual; Associated lists suggested gear options according to motor type. No, don't get up; I'll check for you. OK, the fastest motor listed is a 10-turn double, which Associated recommends you run with a 16-tooth pinion and 87-tooth spur (that's

the spur your truck came with, if you bought it new). If you're just going for screaming speed runs on pavement, you could put a 17-tooth pinion on there. Have fun.  
—Pete

## Land(max) Ho!

I have been trying to research this car and noticed that you guys did a "Thrash Test" on it last year. Is this a serious car? A group of my coworkers and I are considering purchasing these cars to start a new race division; we might even build a new track specially designed for rally cars. Any information or insights will be greatly appreciated. [email]  
ANDREW

Andrew, I'm sure you'll enjoy this issue's "2nd Look" at the Landmax. Since the Landmax series is based on world-championship-winning Inferno 1/8 buggy technology, the cars can't help but be "serious." But unlike a race-prepped Inferno, the Max cars are very easy to live with, thanks to Kyosho's reliable .21 pull-start engine. You and your buddies will have a blast with them, I'm sure. You should also check out the truck version of the Landmax chassis in this month's "Inside Scoop." —Steve

## Dragging Sparks

My racing buddies and I read the "Getting Started in R/C Drag Racing" in the March '99 issue and are interested in racing—especially the Bolink drag cars shown on the opening pages. Exactly which components did you use to finish the cars?  
AARON RAINES  
Sparks, MD

Aaron, we have received many letters and several calls on the subject of inexpensive drag racing. Many were from track owners who are starting a spec drag class of their own using the Bolink chassis. Here is an example of one club's equipment regulations:

- Bolink Pro stock chassis (to be run box stock—absolutely no modifications);
- Budget AM radio (Futaba Sport, Airtronics Rival, JR Python, etc.);

**WRITE TO US!** We welcome your photos, drawings, comments and suggestions. Letters should be addressed to "Letters," Air Age Inc., Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. Letters may be edited for clarity and brevity, and each must include a full name and address or telephone number so that the identity of the sender can be verified. We regret that, owing to the tremendous numbers of letters we receive, we can't respond to every one.

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Greg Vogel: [gregv@airage.com](mailto:gregv@airage.com)

- Budget ESC (Novak Duster, Tekin Formula 10, DuraTrax Spike, etc.);
- 1500mAh stick-type battery;
- Machine-wound motor.

These rules allow everyone who competes to have a fair shot at winning without spending a fortune. For our cars, we used Trinity Monsters of Touring 15-turn motors and AmpMax 1500mAh batteries, Novak Duster ESCs and JR Racing radio gear.  
—Greg

## Reader most likely to get an "AE" Tattoo

I'm an Associated guy from way back, so I was stoked to see the A-team (as you call them) do so well in the "Readers' Choice" voting. But what I think are really cool are the photos of the winning B3s from the Reedy race. What really stands out on those cars is—nothing! They looked totally stock, except for the titanium tie rods (tie rods!). How cool is that? The B3 on my shelf can run with Frosty and Pavidis! Associated rules! [email]  
JOSH WHITMAN

Yes, Josh, it is a great time to be an R/C racer. In fairness, I'll point out that Losi's XX "CR" buggy is also a national-caliber machine (especially if you get the Kinwald model), and Schumacher's Fireblade ain't chopped liver. Back to the broad spectrum: racing hardware is better than ever. It's sort of like the motocross world in which "works" bikes have been replaced by what are essentially showroom motorcycles (prototype 4-strokes excepted). However, a rule change mandated the move to production motorcycles, not the quality of the machines. In R/C, "works" cars are rare simply because they aren't required to win! —Pete ■



## IT'S OFFICIAL! &lt; &lt; &lt; &lt;

In a not-too-surprising announcement, Ernest N. Provetti, chief executive officer of Trinity Products Inc., and Gilbert E. Losi, president of Team Losi Inc., have agreed "in principle" to a partnership. Although Trinity Products Inc. will remain in New Jersey and will be completely owned by Ernest N. Provetti, Team Losi Inc. will be formed into an equal partnership and ownership split between Ernest N. Provetti and Gil "Pops" Losi.

"The synergy between the two companies has been long stated, and it was only a matter of time before the two of us got together," said Pops Losi. Gil will concentrate on the new and profitable yo-yo division and more mainstream, toy-related items, and along with Gil Losi Jr., he will also oversee the engineering department of the R/C car division. Mr. Provetti will concentrate on the overall promotional end of the company, dealing with the marketing of all the divisions and with personnel issues and the race team.

Mr. Provetti stresses that, "... although we will try to improve

# TRINITY TEAM LOSI

and make some changes in the future, we are dedicated to having a smooth transition and to keeping most of the Losi company policy intact. There is no reason to try and alter a very successful formula." Mr. Provetti adds: "I look forward to working with Gil, who has been a friend of mine for years, and with all the partners and alliances he has built over the years."

Both partners feel that this move will not only make both companies stronger in the marketplace but will also allow them to create more exciting and value-added products for their customer base. Look for exciting things to come from Team Losi in the future as it helps lead our industry into the next millennium.



BY CHRIS CHIANELLI

## Landmax American Style

This beautiful 1/8-scale Ford 150 is the latest in Kyosho's Landmax series, and it really captures the awesome look of a full-scale stadium racer—right down to those wheels and tires. Like all other Landmax series kits, the Ford comes 60-percent preassembled. Big-block glow power is provided by an included Kyosho GS-21R engine with pull-starter.

Kyosho has not only brought the Landmax series into full off-road service, but it has also gone in the other direction by replacing the original rally tires with slicks on the new road-racing versions of the Landmax: the Alfa Romeo and Volvo S40.

Great Planes Model Distributors, 2904 Research Rd., Champaign, IL 61826-9021; (217) 398-6300; fax (217) 398-0008.



## .21 WATCH

Rumor has it that HPI is working on an 1/8-scale on-road car, and this is the new .21 for it. The rumors don't stop there; evidently, NovaRossi is going to be making the engine for HPI, and you know what that means: speed!! Also shown is O.S.'s pull-start version of its .21 RG, which (of course) will be known as the RGX. With Thunder Tiger, Kyosho and now O.S. making .21 pull-starts available, starting boxes may become a thing of the past when it comes to 1/8 scale.



## Get the blues —Kinwald style!

Trinity has announced a new line of parts that will be sold under the "Team Kinwald" name. The line was previously available through Titan Tech in Southern California, and it includes a wide variety of high-performance accessories, including components for the hottest off-road vehicles from Team Losi and Team Associated and their latest products for the DuraTrax Maximum ST. All parts are manufactured to exacting tolerances using high-quality aluminum and titanium materials, and they're finished in the traditional "Kinwald Blue."

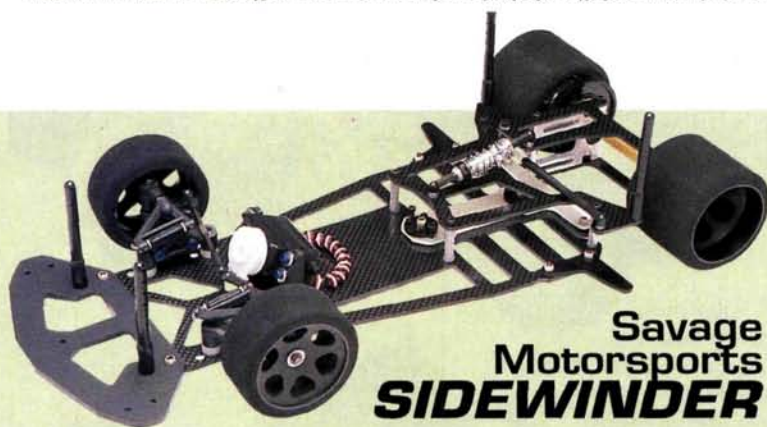




## PROTOFORM KEEPS ON TRUCKIN'

Street cruisin' truck enthusiasts, your body has arrived. This sleek, new Silverado Sport is custom fit for 190mm touring cars and gives your machine that "slammed" street look. Included decals allow you to choose a "mild custom" or "full race" look, and the wing shown here is included—as are mounting hardware, detail stickers and window masks (gotta have window masks). Also new: this 1/12-scale '99 Taurus with add-on spoiler—a perfect fit for the new breed of LTO mini-machines. You know this high-downforce shell is fast 'cause Frank Polimeda used it to TQ and win the K&N Raceway Winter Blast race. OK, so it drives fast; the Taurus also paints fast, thanks to the included window masks and detail decal sheet with window net, headlights, grill and more.

Protoform Inc., P.O. Box 456, Beaumont, CA 92223; (909) 849-9781; fax (909) 849-2968.



**Savage Motorsports  
SIDEWINDER**

There's a new breed of direct, 2WD sedan chassis that has been burning up the track, and the Sidewinder GT-1 is the latest entry in this new brood. The kit features IRS axle assembly, T-plate design with three tweak-screw locations, aluminum motor plates, ball bearings, Jaco tires, Associated VCS center shock and front suspension and solid graphite components. The chassis accepts those cool 190mm and 200mm GT-1 and GT-2 bodies.

World Class Batteries, 8700 Kugler Mill Rd., Cincinnati, OH 45243; (303) 652-3038, or Pit Row, (513) 891-7487.

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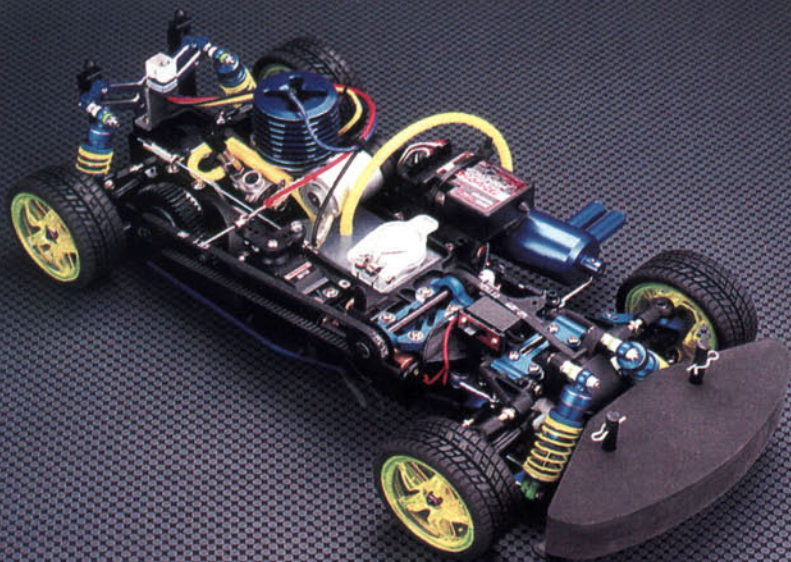
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## East Coast Aluminum

Thought you guys would like a look at the new, blue-anodized aluminum parts for the Traxxas 4-Tec sedan. These include front and rear knuckles; front and rear suspension arms with pins; center shaft mount, rear shock tower, upper arm holder, servo mount, front and rear shocks and steering bellcrank.

East Coast R/C Hobbies, Powerline Racing Products, 2515 65th St., Brooklyn, NY 11204; (718) 627-3814.

## Shell Games



### Bolink '99 Pontiac

Featuring new front-end detail for the latest in the cup racer look and improved aerodynamics for optimized superspeedway stability, Bolink introduces its '99 Pontiac Narrow, available in both standard and Pro-Lite versions.

Bolink R/C Cars Inc., 420 Hosea Rd., Lawrenceville, GA 30045; (770) 963-0252; fax (770) 963-7334.

### Parma '99 Accord

Known for its scale body line, Parma Intl. now offers this aerodynamic Honda Accord; it's a racier switch for the company and should prove itself worthy on the touring-car race scene. The raised trunk provides more downforce at the rear while the sleek front end should result in better steering response. Made of lightweight .030 Lexan, it comes with vinyl window masks and detail decals.

Parma Intl. Inc., 13927

Progress Pky., North

Royalton, OH

44133-4394;

(440) 237-

8650; fax

(440) 237-

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Yokomo, Schumacher Etc.



## World Cup Spider

**K**yosho now offers an all-out GP Spider MKII chassis designed for World Cup competition. This specially hopped-up version of the original GP Spider chassis includes many new high-performance upgrades, including a special main chassis, Teflon touring shocks, carbon shock towers and upper plate, a 2-speed transmission and hardened main and counter pulleys. This World Cup version retains many of the proven features of the original GP Spider MKII, such as a lower mounted front servo, open-style front and rear gearboxes and full ball bearings. This new chassis comes

with the twin ball-bearing, specially ported GS-11R engine. The Cup racer is also available without an engine.

Also shown is the new, economy-price 2WD Spider that's available in EP (electric power) and GP (glow power) versions. These rear-wheel-drive cars draw on the proven designs of their 4WD coun-



terparts. The EP version comes with the diff already assembled and mounted on the chassis, and the GP version comes with a specially ported, twin ball-bearing GS-11R engine. Both feature oil-filled SS racing shocks, high-grip

rear tires and precut body masking and are available with a McLaren F1 or AMG Mercedes body.

Great Planes Model Distributors, 2904 Research Rd., Champaign, IL 61826-9021; (217) 398-6300; fax (217) 398-0008.



## JUGGERNAUT UPDATE

**A**t the East Coast Hobby Show in Fort Washington, PA, Tamiya revealed to the U.S. their new Juggernaut monster truck. Assistant Editor Greg "The Swab" Vogel had a chance to snap a couple of shots of the truck, and he gives us this report:

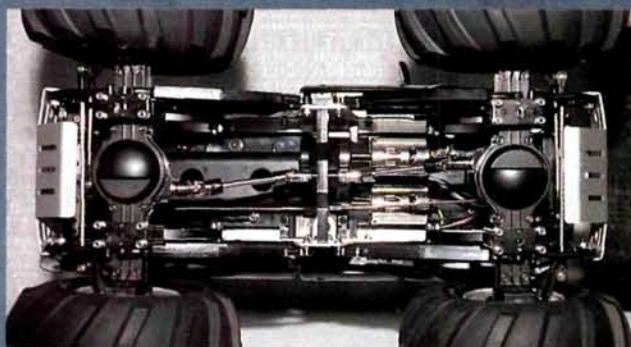
Tamiya went all out on scale appearance with the Juggernaut. The "hard" Ford 350 body is detailed to the max and includes chrome bumpers and a roll/light bar that can be fitted with an optional light set. The front of the body is screwed down to the chassis, while the rear hinges allow access to the battery pack (I bet we'll see several Kevin "Hingeboy" Hetmanski pro-



jects with this truck.)

Notice that Tamiya uses an aluminum chassis with plastic chassis rails to which the friction shocks are mounted. Stout trailing linkages along with leaf springs are also used to suspend the truck. Tamiya rep David Jun told me that the steering linkage has been improved as well. The two tie rods extending from the servo-saver are now of equal length to ensure equal steering throw. Steering knuckles are the only hint of Clod Buster on the Juggernaut; the rest is all new!

Both motors are mounted on a central gearbox, thereby eliminating the need for a reverse-rotation motor as required by the Clod Buster. The power is transferred to the front and rear axles with universal drive joints. Check out the large diff cases; just too cool for words, and the aluminum bash guards are an excellent touch. The wheel and tire combo is also stunning; shiny chrome rims and massive treads on the Chevron tires. The Juggernaut is sure to wreak havoc on any terrain. I can't wait to get behind the trigger on this truck!



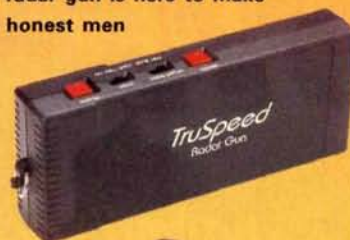
## TRUSPEED—NO LIES

How many times have you heard this one at the local track:

"My sedan does 80mph, easy."

"Oh, yeah? My monster truck does 100mph!"

Well, the affordable TruSpeed radar gun is here to make honest men



of all of us by acting as club referee at speed events and/or disputes. TruSpeed's accuracy is better than  $\pm 0.5$ mph; it has three, easy-to-use operating modes, 10-speed memory and an operational range of 0 to 150mph. TruSpeed operates for up to 15 hours on two, 9V batteries and has a tuning-fork accuracy-verification feature, and it can be mounted on any camera tripod.

Speed Products Inc., Ste. 402, 3587 Rt. 9, Freehold, NJ 07728; (732) 761-2525.



Send a sharp, uncluttered, well-exposed color photo of your car or truck (no Polaroids, please!), along with a brief description, to Readers' Rides, *R/C Car Action*, 100 East Ridge, Ridgefield, CT 06877-4606. If we choose to feature your creation, you'll receive a 6-month subscription to *R/C Car Action*, or an extension of your existing subscription. You'll also be eligible to win a \$500 gift certificate from DuraTrax in the ninth annual "Readers' Rides of the Year Contest" in the fall of 1999. In case we need to contact you, write your address and phone number on your letter and on the back of every photo you send. Good luck!



### Doors Ajar

This stylish Kyosho SuperTen McLaren F1 GTR belongs to Bulent Dosdemir of Istanbul, Turkey. Along with standard kit parts, he has equipped it with an Airtronics 3PS radio and servos. The doors and rear motor cover are functional; they're hinged to open as on a full-size car. Bulent says he uses this body for display only; we can't say we blame him!

### The "Aluminator"

Todd Galland of Fremont, CA, says he "went berserk" tricking out his HPI Nitro RS4. HPI parts include purple-anodized chassis, aluminum pro shocks, carbon-fiber shock towers and a lightweight flywheel. Alloy TOP parts include front and rear bulkheads and swing arms, steering bellcranks and front steering hubs. The car is powered by an O.S. CV .12 motor and also features an alloy upper deck and front belt tensioner from Zipp. But that's not all, folks; among the other alloy parts are CRC belt pulleys, rear brace and side belt tensioner. The car also has MIP CVDs and turnbuckles. That's a lotta car!



### Wednesday Racing

This HPI Nitro Racer belongs to Leonardo Torres of Kearny, NJ. It features a CVEC side tuned pipe, ball bearings and HPI super-narrow X-Pattern tires, and it's topped off by a CLK GTR body painted with an "Addams Family" motif by Leonardo and his friend Brian. An FM JR XR3 radio controls the vehicle. As far as Leonardo is concerned, "Wednesday is race day!"



### Big Rig

Fred Horton of Beaufort, SC, built this custom-made Peterbilt wrecker; he started with a Wedico long chassis and a Peterbilt cab and sleeper. Two of the rig's three rear axles are driven by twin motors through a 3-speed transmission, drive shafts and tandem diffs. Fred extended the front bumper for a dummy winch. Among its other features are working headlights, clearance lights, taillights, brake lights, backup lights and a sound package. There are strobe lights on the boom, which can swing left and right and can be raised and lowered via a Robart hydraulic cylinder powered by a Wedico hydraulic pump. All the compartment doors are functional.





## Sharp-Dressed Car

This Losi truck built by Amber George of Indiana, PA, was transformed via a DuraTrax LXT gas-conversion kit. The suspension is mostly RPM with original Losi shocks. Beneath the hood is a hand-ported O.S. CZ-R engine with a Stage II head, Robinson Racing gears and a fully adjustable clutch system. This beauty runs great and has won many races because, as Amber says, "An old Losi never dies!"



## Fire Power

Kenneth Cheng of Los Angeles painted the dragons on both sides of this Mercedes CLK GTR, and he also custom-made the headlights and blue fog lights for this H.A.R.M. Modellprogramm 1/5-scale GT. Wonder if he "smokes" the competition?



## Speeding Bullet

Glenn Cauley of Orléans, Ontario, Canada, says this Bullet Pro from Full Speed Racing (FSR) is his latest toy. The 1/10-scale, 4WD electric touring car features a Novak Cyclone ESC, Reedy FireHawk stock motor, Trinity VIS-Extra EX-TECH RC2000 6-cell saddle packs, an Airtronics Caliber 3PS radio and a Novak Mercury FM 27MHz receiver. Among its many options are FSR front and rear anti-roll bars, numerous titanium parts and a Yokomo foam front bumper. Custom modifications include Kydex nerf wings and an O-ring battery-retention system. All this is topped off with a Protoform Volvo S40 body. According to Glenn, "This is my first ever touring car ... it has taught me a lot about setup, and I find the car an absolute hoot to drive."



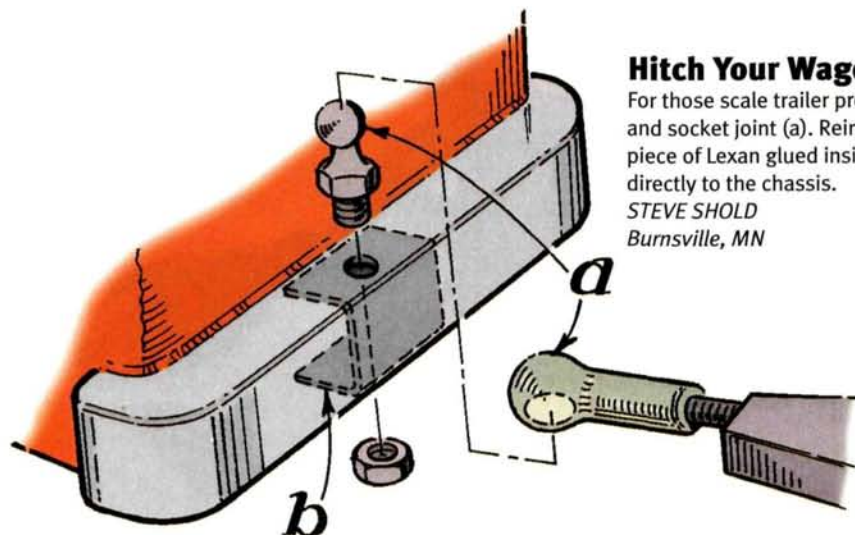
## Cruisin' in Style

Brett Turnage of Moreno Valley, CA, owns this Tamiya TL-01 Ford SVT F-150 Lightning; it's stock inside except for a Novak Rooster reversible speed control. Outside, it's tricked out with RPM sunburst rims and a Testors paint job finished off with Pactra Trim Tape. A Futaba Magnum Sport controls the truck; it's a California hot-rod, indeed!



BY JIM NEWMAN

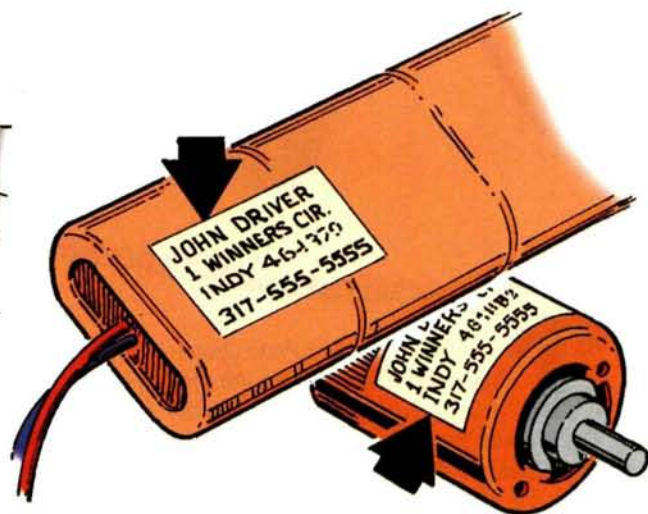
Radio Control Car Action will give a one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Pit Tips." Send a rough sketch to Jim Newman, c/o Radio Control Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. We're unable to publish many good tips because we don't have the sender's name and address. Please note: because of the number of ideas we receive, we can neither acknowledge every one, nor can we return unused material.



## Hitch Your Wagon

For those scale trailer projects, make a ball hitch with a large ball and socket joint (a). Reinforce your truck bumper with an extra piece of Lexan glued inside (b), or better yet, attach the hitch directly to the chassis.

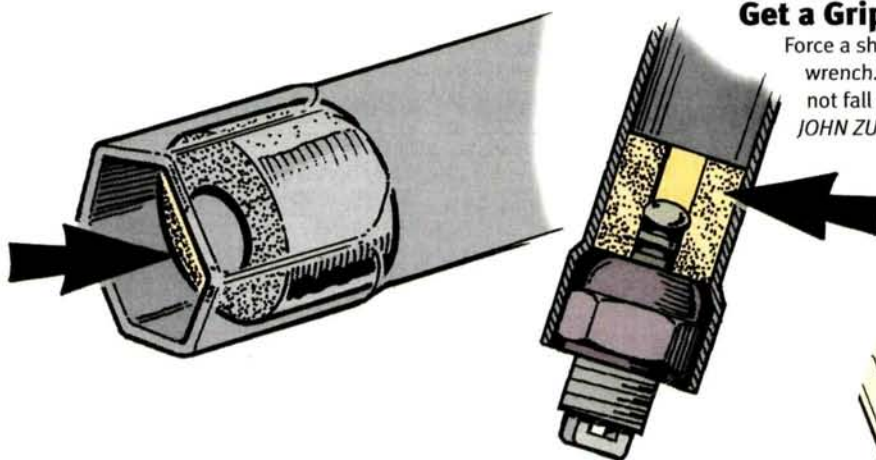
STEVE SHOLD  
Burnsville, MN



## Lost Luggage

Stick a return-address label such as those used on letters on each of your battery packs in case you leave one behind at the track. Add your phone number, too!

MIKE ROMMEL  
Prince George, BC, Canada



## Get a Grip

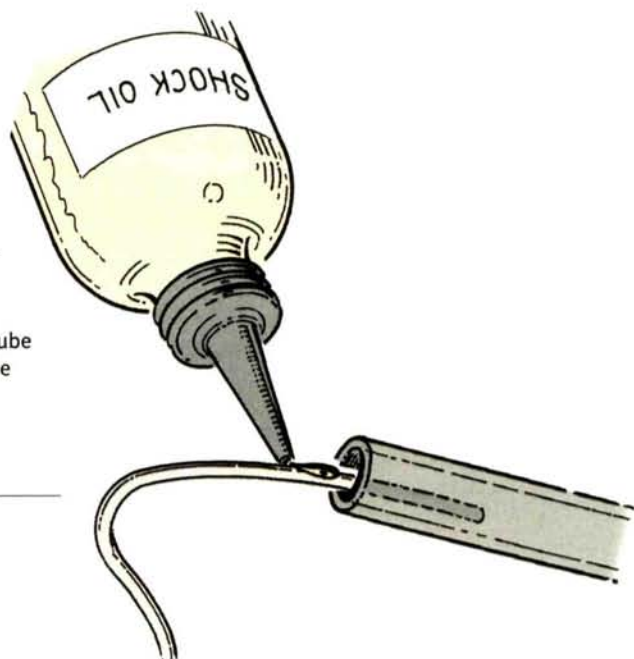
Force a short piece of fuel line into the end of your glow-plug wrench. This will grip the post of the glow plug so that it does not fall out when you lower the plug into the head recess.

JOHN ZUBER  
Huntsville, AL

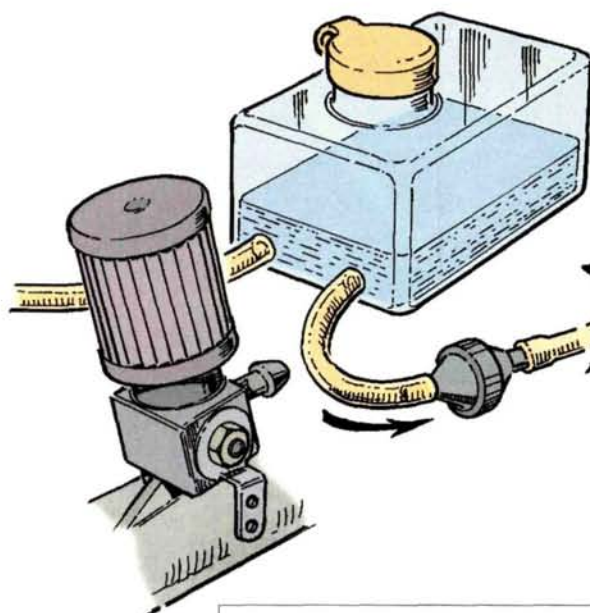
## Slick Fit

Don't you hate when your antenna wire gets stuck in the antenna tube with just inches to go? If you first put a small drop of shock oil in the tube, the wire will slide in easily.

JEFF LOHMAN  
Bothell, WA







## Big Sucker

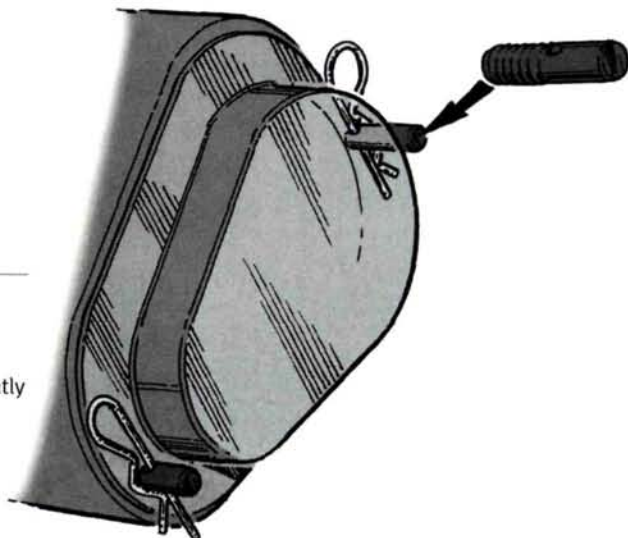
Rather than blowing through the pressure line to empty your tank after a day's running, draw the fuel through the carburetor's feed line with a large syringe from a pet store. Then use the syringe to squirt the fuel back into your storage bottle. No fuel is wasted, and you'll never have to taste nitro again!

JARED DUNNING  
Springfield, MO

## Quick Fix

Make your gear cover detachable by threading cross-drilled screws into the gear case. The gear cover fits neatly over the screws and can be retained with a pair of body clips—a great time-saver in the pits.

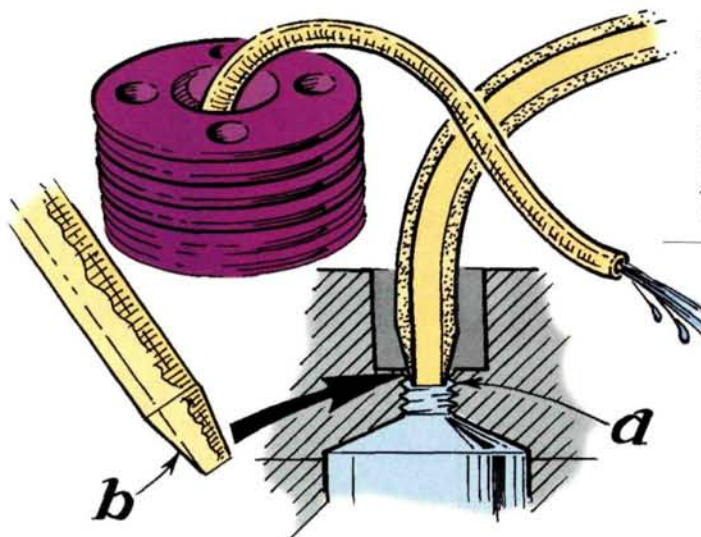
M. LOUIZOU  
Yonkers, NY



## A Splatter Matter

To clear a flooded engine, remove the glow plug, then screw a piece of fuel line into the plug hole (a) and bury the other end in a rag so that the excess fuel does not splatter everywhere when you turn it over. Taper the end of the fuel line (b) with a razor blade so that it fits into the hole.

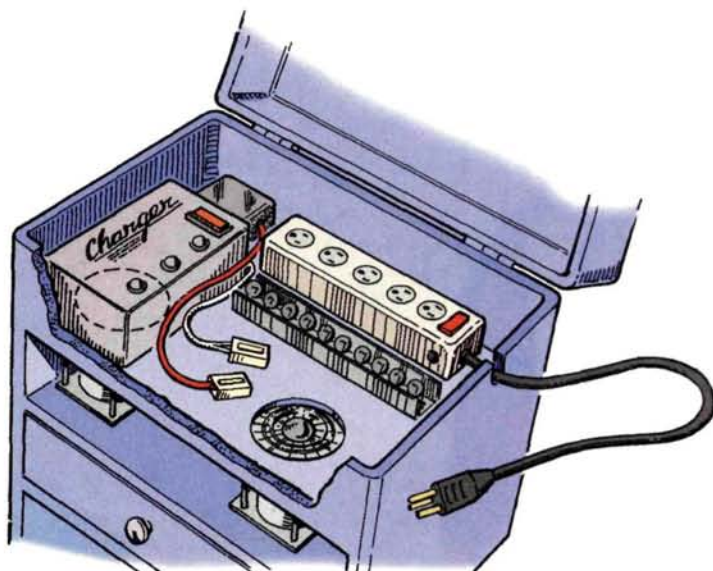
JESSE WILLIAMS  
Winston-Salem, NC



## Battery Center

Convert an inexpensive plastic toolbox into a battery super-cooler by discarding the top drawer and installing a pair of computer cooling fans. The top tray holds an outlet strip, charger, discharger and cutoff box, and there's space for the charging/discharging Ni-Cd. Store your spare Ni-Cd packs in the other drawers.

D. J. CLARK  
Deming, NM







**ROBINSON RACING PRODUCTS**

## TROUBLESHOOTING

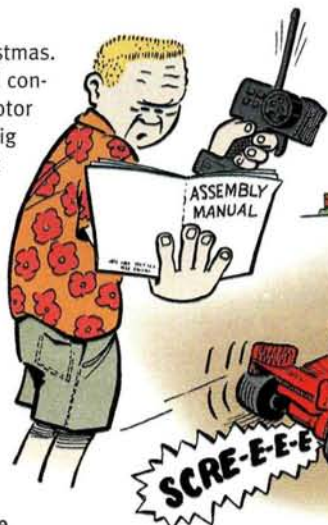
BY DOUG MERTES • ILLUSTRATIONS BY JIM NEWMAN

### Listen Up

My Dad bought me an Associated B2 for Christmas. Since then, I've upgraded it with a Tekin speed control, a Magnetic Mayhem 22-turn modified motor and Trinity Voltmax batteries, but I have two big problems. First, I'm not really sure how tight the slipper clutch should be or how to tell when it's set correctly. I'm also confused about the differential: it seems smooth, but how tightly should the nut be screwed down? My friends say that it should slip a little, but isn't that what the slipper clutch is for? Do you have any ideas? [email]

BOBBY CURCHMAN

The Stealth transmission that comes with Associated's line of off-road trucks and buggies is not very complex, and when it's assembled properly, it requires very little maintenance and only periodic adjustment. Start by pulling out the assembly manual that came with your B2. Go to the section on building the tranny and review the instructions on how



tight the main center screw for the differential needs to be. If memory serves me, I believe you should bottom out the spring then back it off  $\frac{1}{8}$  turn.

The slipper clutch should slip for the first foot or two of takeoff from a dead stop; I've found that easiest to set "by ear." Put the car on the track, and hit the throttle hard, much as you would at the beginning of a race.

Listen carefully; you'll hear the slipper working and then hooking up. Set it so it slips for no more than 2 feet or so. Again, your manual can help. You'll have to reset the slipper clutch from time to time, depending on the tires, track conditions and the type of motor you installed.

Another option is just to leave the slipper very tight. Many drivers use the slipper clutch simply to protect the transmission, and they just tighten it until it doesn't slip.

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**RC10 GT Clutch Bells:** Precision machined one-at-a-time from a single piece of steel and then hardened. Fits ALL Associated and MIP shoes. (New 14T) RRP 2214 - RRP 2224.



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### Associated Blue Lightened Slipper Kit:



The rear plate is hard anodized to reduce wear and the front plate is color treated. The front plate is designed to hold the slipper pad forcing the pad to slip on the rear plate. When pad shows sign of wear just flip it over for a new surface. Metal parts are CNC machined for a flawless fit. RRP 1515.



**Titanium Stealth Top Shaft:** CNC Machined from a single piece of titanium, this super hard, super light top shaft will fit any Stealth transmission. No serious racer should do without this part. RRP 1512.

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— Richard Saxton

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## Popping Problem

I have an older Losi Double-X truck that I bought used for a really good price. I'm just starting out in R/C, so I didn't want to spend a lot of money. My problem is that the plastic ends keep popping off the metal balls that hold the links on the shock towers and steering spindles. Is this typical? I'm thinking about racing, but I'm sure that this problem would make it difficult to finish a race. How can I make them stay on longer? Is this a common problem? A lot of my friends have had the same experience, and it's pretty frustrating!

DARREL FULSOM  
Hollywood, FL

Darrel, if I had a nickel for every time I've had to reconnect a separated ball cup, I'd be able to buy a new buggy! The problem occurs when, over time, the nylon ball end becomes stretched out; since the only thing holding it on the metal ball stud is the tension around the base of the cup, there's no way to repair it once it becomes loose. Because truck tires are heavy, they place a lot of strain on the suspension and steering linkage. As you have discovered, when the ball ends start to stretch on a truck, they pop off every time you hit a big bump or a corner marker.

Although many companies make replacement plastic ball ends, I particularly like those made by RPM\* and Robinson\*. They're slightly longer, have more meat in the thread area than older designs and grip the ball tightly without binding the link's action. The Robinson ball ends even have a setscrew so the clearance between the ball end and the stud can be adjusted. Of course, you can always install the stock replacement pieces from Losi; the ones on my Double-XT are still holding nicely after almost two years of use!



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## TROUBLESHOOTING

### Escape Velocity

When my car goes off the jumps that I made for it, it always seems to do a nosedive. Is there a way to get the car to make these jumps without landing nose first? Also, when I am driving around, the battery runs out really quickly. I would like to drive for longer periods, and I wonder whether there is anything I can do to make the car run longer. Would a more powerful battery help, or is there some trick that you can tell me about?

ZACHARY ELLINGER  
Sheboygan Falls, WI



The way that cars and trucks fly and land depends on the angle of the jump, the speed at takeoff, the weight distribution of the vehicle, and what the driver does with the throttle during flight. If the ramp is too steep, your car will go up and down like a rocket no matter what you do, so set up your jumps with a maximum angle of 30 degrees; you'll get plenty of height without killing your car when it lands. Depending on where you've placed the jump, top speed and a long run may not be the best way to go.

Start by cranking off the ramp at medium throttle and see what happens. Work up to progressively higher speeds; you'll eventually reach a level at which the car just isn't happy with what you're doing. I call that "escape velocity," and it's the point at which you ought to back off. Your index finger also has a profound effect on the car's flight attitude. Pour on a bunch of trigger while the car is in flight, and the nose will rise until it points to the sky. Obviously, landing the car on its rear end can result in body or transmission damage, and that's not cool. If you hit the brake or let off on the throttle during air time, the nose will drop, and in extreme cases, the car will actually flip over forward. Your best bet is to smoothly adjust the throttle while the vehicle is in the air so that it lands simultaneously on all four wheels.

As far as run time is concerned, you should get 5 to 7 minutes of run time with a ROAR stock motor and a 1500 pack. If your run time is under 4 minutes, you may not be charging your batteries properly or your car may be over-gear. If you use a timed charger, crank the timer around for a total of 22 to 25 minutes to recharge a discharged 1500 pack. If the pack was at room temperature when you started, it should be warm to the touch when it has peaked and is ready to go. If it's still cold, it isn't ready.

### Hard Starter ...

I have an Associated RC10GT with an O.S. engine. The problem is that the car is now much harder to start than when I first got it, and it doesn't seem to have as much power, either. It still goes pretty fast down the long straight parts of the track but won't fly as far off the jumps unless I get a good run at them. I hope you can recommend a solution to my problem. Please make it easy because I am 13 years old and this is my first gas car, so I don't know much about it.

FRANK WINSLOW  
Seattle, WA

Frank, you didn't say what type of O.S. engine you have in your GT, but we can make certain assumptions based on your description of the problem. Let's start at the top of the engine and work our way down. How often do you change your glow plug? You may simply have a fouled or dirty plug, and that can make the engine difficult to start and prone to flameouts when it idles. Next, take a look at the bolts that secure the head to the crankcase. Frequent heat cycling can loosen these over time and may lead to a small air leak, loss of compression and

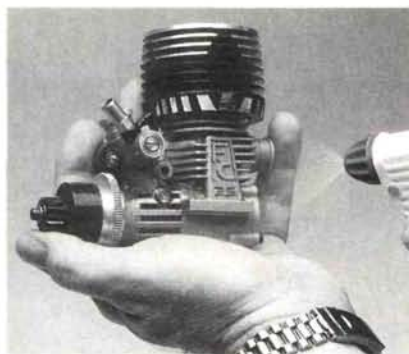
the other problems you described; check them after every hour of run time. How about the air filter? Foam filters need to be cleaned regularly, or they can clog and then choke the supply of air to the motor. If you haven't changed the filter or washed and re-oiled it lately, add that activity to your regular maintenance program. Disassemble and clean the in-line gas filter. It can pick up an amazing amount of grunge while running through a gallon of nitro, and your difficulties could easily be because there's an obstruction in the fuel lines. If you haven't been using a fuel filter, remove the fuel tubing and check it for blockage. Install a filter and blow out the carb inlet with compressed air. Don't ever try to clean the jets with a piece of wire, as this can enlarge the jet to the point at which the engine will never run properly. If all this fails, you may have simply run the engine so long that it's time to replace the piston or cylinder liner. No matter how well you take care of your engine, the clearance between the piston and liner will eventually become so large that the only way to restore performance is with replacement parts. ■





## Death to evil air leaks

*Below: less is more. Squeeze some sealer onto a scrap of paper and apply with a thin paper clip or a toothpick. Use just enough to ensure a proper seal—no more. You don't want excess sealer to get into the engine; it will cause more problems than it solves. Right: garden-variety silicone sealers have ingredients that can cause corrosion inside an engine. Inspect the package when you shop for a sealer to ensure it's suitable for high-temperature applications and that the sealer is "sensor safe" or "oxygen-sensor safe."*



*Clean the engine thoroughly before sealing. I use a can of carburetor cleaner. The spray pressure really gets out the fine dust. If you think an air leak is bad, see what happens when you seal dirt inside the engine! Clean it, and use safety glasses.*

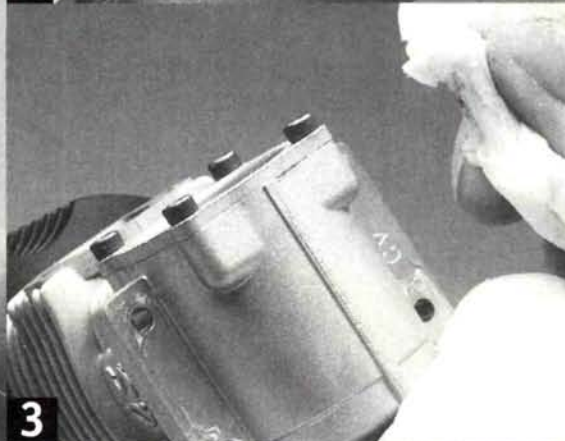
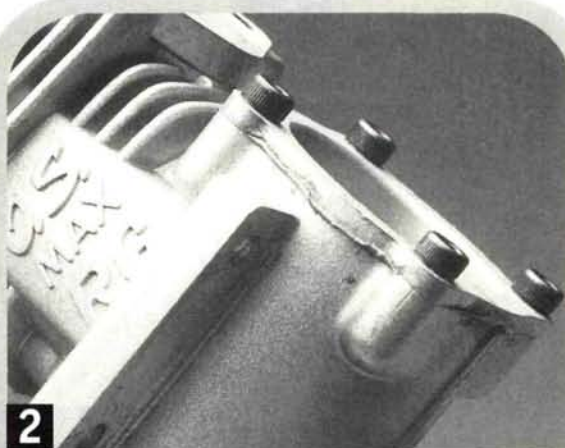
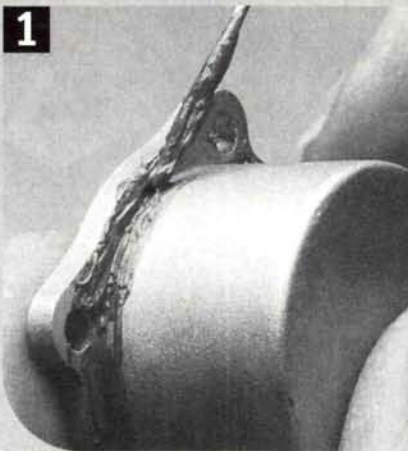
*The backing plate can be a source of air leaks. Torn gaskets are a regular problem, but don't be fooled into thinking that a backing plate with an O-ring will always be properly sealed; it can leak just as badly as can a torn gasket.*

**T**here's only one place you want your nitro engine to be sucking air, and that's through the carburetor. If air is leaking anywhere else, even a little, it will destroy the necessary negative crankcase pressure that is the force that sucks the air/fuel mix into the engine. If your engine isn't drawing the right amount of fuel and air at all rpm levels, it will run poorly—or not at all. Follow these steps closely, and when the last part has been bolted back onto your engine, you should be ready to go. When I could not obtain a certain paper gasket for an otherwise good engine, I used this system in place of the gaskets and was rewarded with a perfect running engine. It works that well. You'll be surprised how much better a sealed engine will run, and you'll kick yourself for not doing it sooner!



### BACKPLATE

**1.** *The backing plate can be a source of air leaks. Torn gaskets are a regular problem, but don't be fooled into thinking that a backing plate with an O-ring will always be properly sealed; it can leak just as badly as can a torn gasket.*

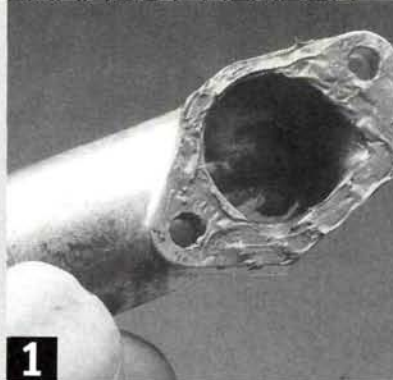


**2.** *When the backing plate is reinstalled, use Loctite on the threads so they don't vibrate loose, and apply an even amount of torque to all bolts.*  
**3.** *Any excess sealer that is squeezed out of the joint when the screws are tightened should be wiped away with a clean cloth. It makes disassembly easier and, if nothing else, makes for a better-looking engine.*



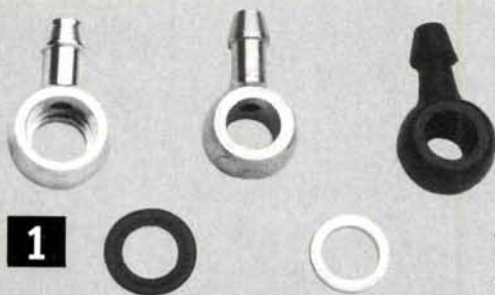
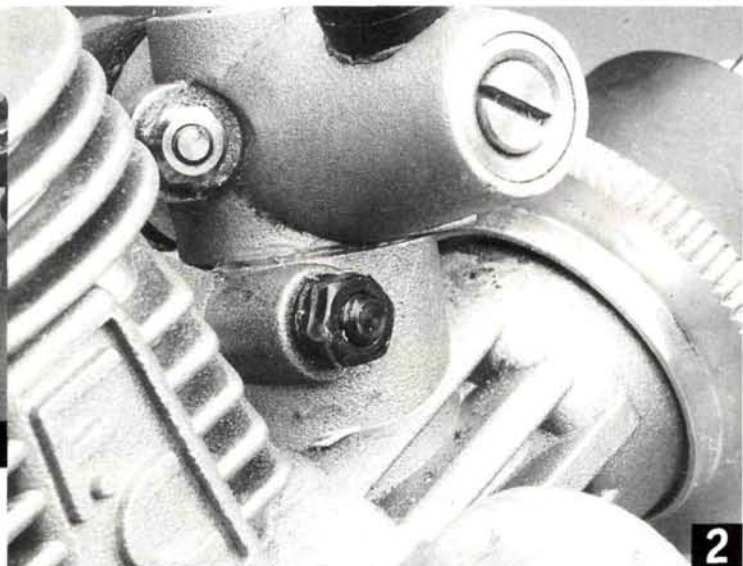
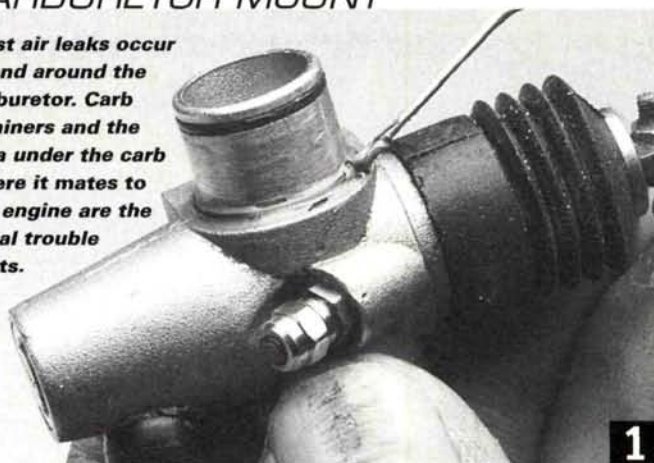
## EXHAUST HEADER

**Bolt-on exhaust headers can also leak. A leaking exhaust header won't have as much effect on proper engine operation as an air leak somewhere in the induction system, but it will have a subtle impact on proper performance.**



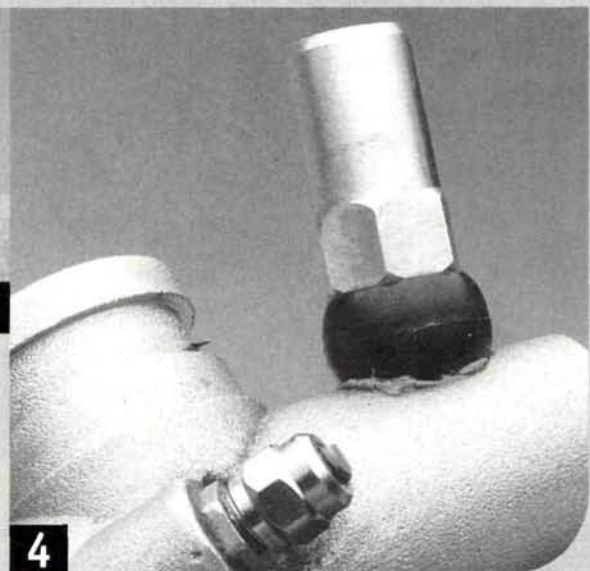
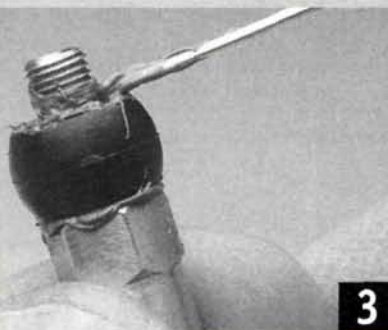
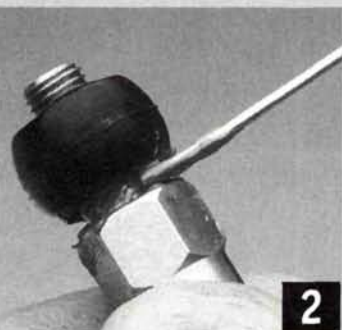
## CARBURETOR MOUNT

**Most air leaks occur in and around the carburetor. Carb retainers and the area under the carb where it mates to the engine are the usual trouble spots.**



## FUEL INLET FITTING

**1. The banjo-style fuel inlets are another source of air leaks. Often, they are not properly sealed at the factory, especially the plastic banjo fittings; they're really bad, and I wish manufacturers wouldn't use them. Machined-aluminum and brass are far better, but even those that are sealed can easily start to leak when you rotate the fitting for more direct fuel-line routing.**



**2. Seal above and below the banjo-type fuel inlet. 3. The amount of sealer used here is excessive for illustration purposes, but you should only use enough to get the job done. Be sure to push the fitting just past the needle-valve-assembly holes before you apply the sealer. Even the smallest amount that is squeezed into the fitting when it is being tightened will cause havoc. Work like a surgeon! 4. When you reinstall the needle valve and fuel inlet, make sure that the fitting points in the direction of the fuel system it is being hooked up to. To move the fitting after the silicone has dried will break the seal.**



## Packing for the big one



**B**etween ROAR, NORRCA, TCS, the Kyosho World Cup, the various Reedy races, Trinity's sponsored on- and off-road events and other major annual gatherings, we have lots of opportunities to compete in "big" events. Most of these are held in cities that boast excellent transportation, and this makes it easy to fly to them if it's too far to drive. Knowing this, imagine you've decided to attend one of those big-time races, but you're a little concerned about how to transport all your equipment to the track.

When you're in the pits at your local track, you're surrounded by a dyno, two power supplies, a couple of chargers, several boxes of spare parts, a box of tires, maybe a spare car or truck, at least one radio, a toolbox full of absolutely necessary gizmos, a box full of batteries, your lunch, a fan, a cooler, a discharger, maybe a few spare motors, and ... well, I think you get the idea. That's a lot of stuff to transport, especially if the only thing you own to carry it all in is that red plastic suitcase your sister left behind when she went off to college. Maybe this wasn't such a good idea, after all. But fear not, my friend; with a little planning and a small dose of common sense, you'll have everything you need to compete successfully in a big event.

### HOW TO GET IT THERE

Whether you drive or fly to the big event, the number of parts and amount of equipment and tuning gear you'll be able to take along will undoubtedly be limited. Of course, if you drive by yourself—or if you own a giant van and keep your traveling buddies to a minimum—you can take everything you want. Most of us aren't that lucky, though. I almost always end up flying to big races, but even when I drive, I take only the most essential stuff. If I limit myself to whatever fits inside a 20x18x16-

inch cardboard box, it's much easier to get it all from the car to the track and then back to the hotel and up to the room. A box this size is easy to carry, and it also happens to fit the nylon pit bag that I fold up and stick inside. I prefer to take this with me on the plane as checked baggage so that when I get to the airport, all I have to do is collect my luggage and head for the rental-car counter. If the airline loses your clothes, at least you'll still be able to compete. A portable folding cart with wheels works perfectly for trans-

porting your box, suitcase and carry-on luggage through the airport. Some of the newer ones, such as the cart I recently picked up from a company called ClickKart, fold up compactly like small umbrellas. Open the cart, stack your equipment and head for the race. Cool!

Another option is to ship the box in advance to the track or sponsoring hobby shop. You can easily collect it when you arrive and just as easily ship it home afterwards. Track and hobby-store owners generally seem willing to accept delivery and hold your things until you

**Decide what you absolutely have to take to the race: tools, batteries, radio, charger, power supply and spares are musts; and don't forget your car!**

arrive, but I always call first to make sure that it's OK, and I always inquire to whom the box should be addressed. I also clearly mark the box with an instruction such as "Please hold for racer Doc Mertes, arriving on Sunday for the Big Event." That way, nobody at the store will think it's a shipment of parts!

### WHAT DO I TAKE?

Whenever you travel, there's an art to deciding what to pack, and although I spend a lot of time on the road, I have yet to really understand how it all works. I know folks who can live out of a small gym bag for a week at a time, but I just can't do that. On the other hand, I've gone to enough major races to be able to figure out which racing gear I really need, and what I can risk leaving behind. It helps if your car or truck is the

one you regularly race at home; you'll have a better idea of what is essential.

I always take along duplicates (used ones are OK) of any unique or difficult-to-obtain components; things like suspension arms, spindles, and other parts that must be of a certain type or brand and that may wear out or break always go into the carton. If I'm going to race in modified, I assemble and dyno extra motors, just in case my favorite mill gets a case of the blahs. If handout motors are used, I also take a combination of brushes and springs; they enable me to better tune a handout motor that might perform inconsistently if left in its stock configuration. I've always relied on the kindness of new friends to help me out with a comm lathe or a dyno, if I need one, but I'm also sure to take



# Team ORION MOTOR TECH

with Oscar Jansen

## PART 8 Basic Care

Before I discuss motor cleaning and rebuilding, let me congratulate my friend and teammate Murai on his great win at the Hong Kong touring-car race. HPI and Team Orion have added another great win to their long list of victories this year. Did you know that we won all the championships in France (touring car, off-road 2WD, 4WD and Pro-10), the English championship, the European championship, etc. Remember: Team Orion started its motor project just 10 months ago!

### Here's what you'll need to refurbish your motor:

- Motor spray
- "Canned air" or a compressor
- Team Orion Free Revs bearing oil
- Old toothbrush
- Comm stick
- Sharp knife
- Motor shims
- Paper towels
- 4-cell battery pack

### Stock-motor maintenance

First, remove the springs and brushes. If you want to reuse your brushes, scratch the "+" or "-" into the top of each brush with the tip of a hobby knife so you can reinstall them in the same position.

Next, use the toothbrush to remove any dirt stuck to the outside of the motor, then follow up with a bath of motor spray. Take a good look inside the motor and search for small bits of stone or sand, as these can easily damage your motor. After cleaning, use the canned air to dry the motor and blast out any trapped motor spray.

Put a drop of motor spray on the comm stick, slide it into the brush holder and spin the armature about three times as you press lightly on the comm stick. Remove the comm stick, clean it and repeat until the comm is completely clean. Finish with a drop of Free Revs on each bushing.

Wet the round end of the comm stick with motor spray and rotate it against each brush face. Clean the comm stick and repeat until the brushes are clean. You are now ready to reassemble the motor. Even if you are not installing new brushes and springs, it's wise to "run in" the motor for five minutes with the 4-cell pack.

Next month, we'll look at mod-motor tuning (which also covers rebuildable stocks like the new Orion Edge). Until then!

## R/C DOCTOR

along some cash in case I have to buy something I've forgotten.

### HOW DO I PACK MY STUFF?

I've seen racers using heavy-duty plastic Rubbermaid-type containers, suitcases, duffel bags and locking trunks (heavy as all get-out, but perfect for the person who must take everything). I prefer a basic corrugated cardboard box, wrapped around several times with heavy-duty

stuff. White dust got all over everything, and when I opened the box at the windy track, an embarrassing amount of it went flying off into the desert!

Place the heavy stuff in the bottom of your container. The next layer should be the more delicate stuff, such as your transmitter and charger, and both of them should be double-wrapped; don't forget a small container of critical tools and spares. Fit larger spares, tires and clothing

after race day. More than once, my traveling load has been lightened because I struck up an Internet conversation with people who were going to the same race; I've avoided unnecessarily lugging stuff like soldering irons, tire truers and dynos. By the same token, I've dragged those cumbersome items to the track for others to use when the big race was being held in my hometown.

Making the trek to a major regional or national



**You don't have to be quite as ambitious as this group when packing for a race! Stick with the essentials.**

strapping tape to prevent it from bursting. My favorite packing materials are bubble wrap and clothing. Bubble wrap can be reused and is easily wrapped around a variety of sensitive, expensive objects such as your transmitter, charger and power supply. The stuff I use has outlived half a dozen cartons and is still going strong; plus, I've never had anything damaged in transit!

Pack clothing around the heavier objects in the carton. After the races, the same (now dirty) laundry can be used for the trip home. Stay away from newspaper, Styrofoam and peanut-shaped packing materials. I shipped a carton to the 1995 NORRCA Nationals in Las Vegas that was filled with my gear and a bunch of that Styrofoam

for the second day into the odd-shaped spaces that remain. Your car or truck goes on top (removing its wheels may help it fit better), surrounded by a final change of clothing or a layer of sponge rubber. A nylon bag folded flat can be laid across the top; it will take up very little space.

### WHO TO HOOK UP WITH

Internet chat rooms and bulletin boards are a good way to meet people who will be attending the same race. It's fun to talk with these folks beforehand to share information on hotels, restaurants, setups, the racers who will attend, directions and so on. Not only will you eventually race with these folks, but you'll also cultivate some new friends to hang with

event is a big commitment. Most people have to take a day or more off work, pay for travel and hotel expenses and justify the investment. On the other hand, it's an opportunity to meet new people, improve your driving skills and see some of the best racers in the world in action. Who knows? You might even get a chance to be seen in *Radio Control Car Action!* ■



# HPI RS4 Rally

by Peter Vieira

**I**'m not sure we can take all the credit, but the popular buggy-to-rally conversion article published in the August 1996 issue of Radio Control Car Action was undeniably one of the sparks that ignited the rally segment that is beginning to flourish today. A true rally firebrand appeared when HPI\* released the RS4

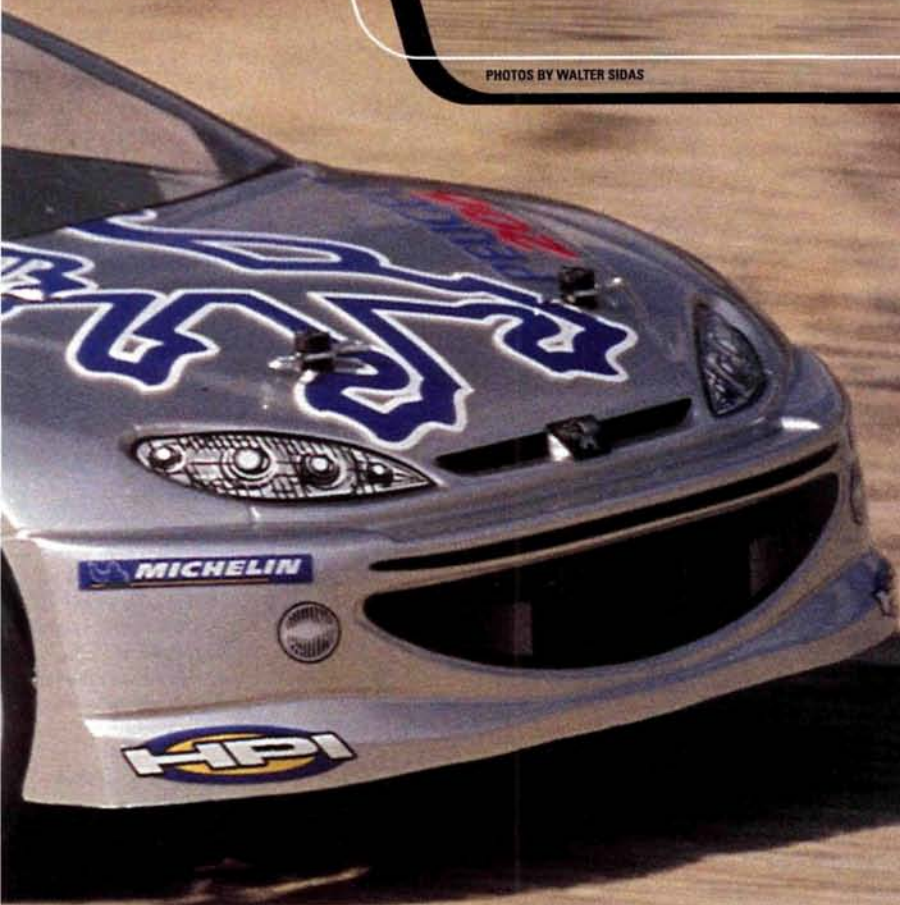


Rally, the latest incarnation of the second-generation RS4 platform. Designed for spirited performance on- and off-road—in other words, authentic rally action—the car has captured the imagination of R/C enthusiasts everywhere. How much fun is it? Can you jump it? All will be revealed.





PHOTOS BY WALTER SIDAS



# TECH GOES TERRAIN



## HPI RS4 RALLY



### s p e c s

SCALE 1/10  
LIST PRICE \$269

DIMENSIONS  
Wheelbase 10.04 in. (255mm)  
Width 7.7 in. (195mm)

WEIGHT  
Gross (as tested) 53.3 oz. (1,511g)

CHASSIS  
Type Double-deck  
Material Fiberglass

DRIVE TRAIN  
Type Dual belt  
Primary Pinion/spur  
Drive shafts Dogbones  
Differential(s) Bevel gears  
Slipper clutch None  
Bearings/bushings Bearings

SUSPENSION (F/R)  
Type Lower A-arm/adjustable upper link  
Damping Plastic oil-filled, coil-over shocks

WHEELS  
Type One-piece plastic  
Dimensions (DxW) 2x1 in. (50.8x25.4mm)

TIRES  
Type HPI Rally pattern

ELECTRICS (not included)  
Motor Team Orion  
Edge stock  
Battery Team Orion 2000mAh  
ESC KO Propo  
KSC-1000 reversing

### YOU'LL NEED

- 2-channel transmitter and receiver.
- Steering servo.
- Electronic speed control.
- Motor.
- CA to mount tires.

### FACTORY OPTIONS\*

- Soft-compound rally tire—part no. 4471.
- Tuning springs  
—red (medium/soft)—6735.  
—green (medium/hard)—6737.
- 4-40 turnbuckle set—A179.
- Swaybar set—A209.
- Graphite  
—rear shock mount—A218.  
—Pro chassis—A232.
- Heat-sink motor plate—A248.
- Slipper clutch—A507.
- RS4 universal drive shafts (wide) F/R—A513/A514.

\*Partial list

### BEARINGS EVERYWHERE

OK; you got me; the bellcranks are bushed; everywhere else, see above.

### USUAL RS4 GOODIES

... such as a quick-release battery tray, full-time, dual-belt 4WD, adjustable servo-saver and front and rear hinge-pin braces.

### GEAR DIFFS

Assemble. Install. Forget. Rugged and simple, gear diffs are ideal for the rally application. HPI's standard units use two spider gears instead of the preferred three or four, to which the response is a resounding, "Who cares?" These diffs are bombproof. Dogbones make the connection to the hubs at both ends of the car, but I installed HPI's optional universals on my car.

### WIDE-TRACK SUSPENSION

The RS4 Rally takes advantage of the RS4 series' 190/200mm arms by opting for the outermost hub position. In addition to increasing the width of the car, the wide stance increases suspension travel. Molded shock towers front and rear add bounce-back durability to the rally-mobile.

### FIBERGLASS CHASSIS

The RS4 Rally is essentially a long-legged RS4 Sport; the fiberglass chassis plates are lifted directly from the popular aforementioned kit. The only differences are the molded bulkhead with built-in front belt tensioner that replaces the simple aluminum plate of the Sport and the conventional rear, upper camber links that replace the Sport's molded "cap" and upper wishbones. There's no concern over space for saddle packs, so the transverse servo placement of the Pro (and now Pro 2) is not used or required.

### RALLY TIRES AND MESH WHEELS

Confession: I picked up a set of chrome wheels for the Rally after I had stolen the kit's gray mesh wheels for use on another car. The kit rubber is aggressively treaded and appears skewed toward off-road use rather than a dual-purpose role. The tire's firm compound should allow the small lugs to last reasonably long, even with frequent pavement excursions.

### UPSWEPT BUMPER

More of a skidplate than a bumper, this seemingly minor detail actually contributes greatly to the Rally's off-road ability by bouncing the chassis up and over roots, rocks, other cars, etc. The body posts are mounted here as well, lending greater support to the nose of the Peugeot shell than the farther aft shock-tower mounts of the touring chassis.

### MEDIUM-LENGTH SHOCKS

Longer than the RS4 Sport and Pro's and shorter than the RS4 MT's, the Rally's medium-length shocks offer plenty of plush travel for off-road excursions but not so much travel that on-road action gets too sloppy. The bladder-equipped plastic dampers use double O-ring seals and are easy to build. The supplied silicone oil, two-hole pistons and black springs deliver a softly sprung suspension system.

### TEST GEAR

• KO Propo\* EX-11 Presto transmitter and receiver • KO Propo standard servo • KO Propo KSC-1000 reversing ESC • Team Orion\* Edge stock motor • Team Orion matched 2000mAh stick pack

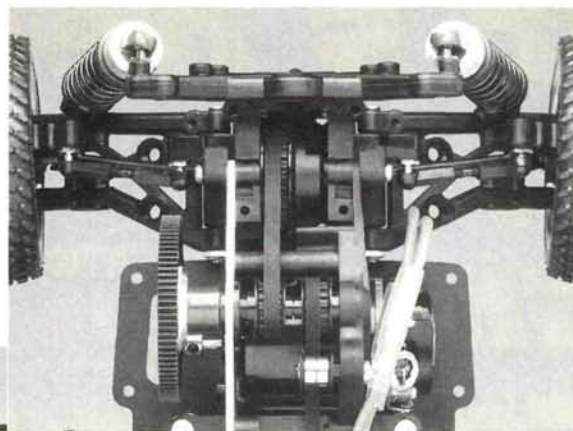


## PERFORMANCE

How do you test a rally car? Without any accepted notion of what a rally track entails, I decided to test the RS4 Rally on pavement as a touring car (which it isn't), then beat on it as though it were a dedicated off-road machine (which it isn't) and see what would happen.

On pavement, two things prevent the car from delivering that "planted" feel we associate with a well set up touring car: the soft suspension-induced body roll and the

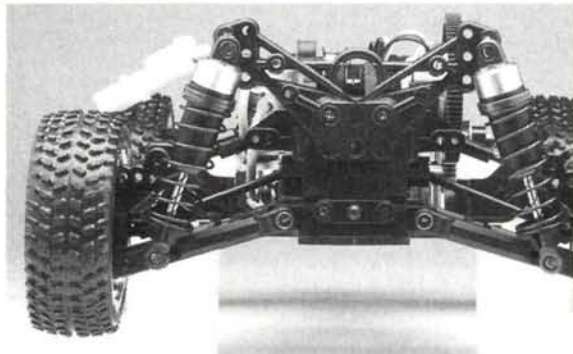
**Right: there's a lot happening here. You can see the gear diff, the rear drive belt and the front belt tensioner (note the bearings that serve as a pulley). Notably absent is the rear bulkhead "cap" that's used on the RS4 Sport and Pro to serve as a mount for wishbone-type upper arms; the Rally uses threaded camber links instead.**



**Left: the upswept front bumper allows the Rally to bounce over many obstacles that would grab a typical sedan bumper. The scoop-lookin' area where the bumper meets the chassis covers the slot for the Lexan undertray.**



**Below: here's the Rally's rear suspension at full sag. The new medium-length shocks increase ground clearance and help the car stick to bumpy terrain.**



■ You might find the diff's output gears don't rotate freely when they are slipped into the diff cases. The drag comes from a barely there (but there enough) bit of flashing on the plastic diff case where the output shaft exits. Just spin a hobby-knife blade lightly around the opening, and free rotation will be your reward. Next tip: don't spare the grease when you assemble the differentials.

## BUILDING &amp; SETUP TIPS

■ Squeeze the ends of the roll pins to make them easier to install. I use a pair of Robo Grip pliers from Sears to do this more easily than with regular pliers; Bob Vila rocks.

■ Protrusions on the front hub carriers must be removed to prevent them from interfering with the suspension arms (this is not required with the Sport or Pro, since they have short shocks). Don't try to hack these off by forcing a hobby knife through the plastic; you're likely to hurt yourself. Shave them away a bit at a time, or better yet, use a rotary tool to grind 'em off.

■ It's hard to trim the flashing off the belt tensioner pulleys completely without leaving them a bit hack-looking on close inspection. Here's the tip: don't worry about it. As long as the faces of the flanges are smooth, they'll do their job.

■ If you plan to pick up an ESC just for the Rally, get a reversing unit; although capable of some serious rough stuff, the Rally car just doesn't have the ground clearance for the really gnarly stuff and will get stuck often. Reverse will back you out of trouble.

■ If you run the Rally on pavement, do your electronics a favor and leave the interior shell/undertray off; this will allow much more cooling air to reach the ESC, battery and motor. To help cooling when the cover is in place, cut an opening in the cowl ahead of the driver. Every little bit helps.

hard tires present less surface area than road treads, as it is only the tips of the tires' small lugs that form the contact patch. However, the Rally's handling is entirely predictable, and its let-it-all-hang-out attitude only makes it more fun to hustle through turns. However, the Rally does run hot because the protective chassis cover all but eliminates cooling airflow around the electronics. When running on pavement or other surfaces on which you can get away with not using the cover, do so.

Off-road testing included a liberal sampling of vacant-lot-type terrain as well as hot laps on a groomed dirt track. As long as there are no obstacles too large to pass beneath the chassis, the RS4 Rally is as composed as a dedicated off-road machine. The absence of a slipper clutch can make it easy to get out of shape on loose surfaces, but full-time 4WD makes it just as easy to reel the car back in. Full-on jumps were sketchy, as the Rally would bottom hard and bounce off the ground painfully. It just wasn't meant for that type of abuse, but it came back again and again for more pounding. The most fun was had when traversing more rally-like roller jumps and drop-offs, which allowed it to drive off the edge (instead of slamming into a lip), extend its suspension arms, then gently soak up the landing on the down-slope. Pitching the Rally through turns sideways was also a lot of fun and produced very scale-looking dust trails in its wake.

- Do-it-all design.
- Virtually indestructible.
- Accepts wide variety of HPI and aftermarket RS4 hop-ups.
- Chassis cover cleverly doubles as scale interior.



- Runs flaming hot with interior shell in place.
- Belts are easily fouled if protective shell is not used.



## FINAL THOUGHTS

Unsurprisingly, the RS4 Rally cannot replace a dedicated touring car or off-roader; however, it does perform reasonably well in both roles without adjustment or modification. For a true comparison of the RS4 Rally's abilities, pit it against your stiffly suspended, no-ground-clearance tourer in the dirt, then challenge your stadium truck to a race around the pylons on pavement. You'll quickly learn to appreciate what the RS4 Rally can do! In addition to its versatility, the Rally has a satisfying scale look and is extremely durable. It's a great play-time companion, and if a racing class takes off, the RS4 Rally will certainly be a front-runner.

\*Addresses are listed alphabetically in the Index of Manufacturers on page 209.

## THE COMPETITION

	HPI RS4 Rally	Yokomo MR-4 Rally	OFNA Z-10 Rally
Wheelbase	10.04 in. (255mm)	10.1 in. (259mm)	10 in. (254mm)
Width	7.7 in. (195mm)	7.4 in. (187mm)	7.6 in. (192mm)
Weight	53.3 oz. (1,512g)	58 oz. (1,650g)	55 oz. (1,565g)
Diff type	Bevel gear	Ball	Ball
Chassis	Fiberglass	Composite plastic	Fiberglass
List price	\$269	\$238	\$250
Available at*	\$165	\$145	\$130
Reviewed in	6/99	6/99**	—

\*Prices vary with location. \*\*First Look



# Associated **RC10L3** Touring Team Edition

by Peter Vieira



## s p e c s

SCALE 1/10  
LIST PRICE \$285

DIMENSIONS  
Width (F/R) 7.3/7.4 in. (185/188mm)

WEIGHT  
Gross, RTR 38.8 oz. (1,100g)

CHASSIS  
Type Plate  
Material Plain-weave graphlite

DRIVE TRAIN  
Type Direct drive  
Primary Pinion/spur gear  
Drive shafts None (straight axle)  
Differential(s) Ball  
Slipper clutch None  
Bearings/bushings Bearings

SUSPENSION (F/R)  
Type Associated Dynamic  
Strut (kingpin/coil)/T-bar  
Damping Friction/VCS oil-filled coil-over shocks

TIRES  
Type Jaco mounted foams,  
green compound  
Dimensions (DxW, F/R) 2.4x1.06/2.4x1.9 in.  
(62x27/62x50mm)

ELECTRICS (not included)  
Motor Reedy Rage  
Battery Reedy Zapper 2000mAh  
ESC LRP IPC V6





# PAN HANDLER

Everything old is new again. The

humble pan car—a less complex machine than the “modern” independent-suspension vehicles—has been reinvented by Team

Associated\* as an alterna-touring car designed to combine three highly desirable (but often incompatible) traits: simplicity, low cost and high performance. Not conceived as a replacement for or even as a direct competitor with

4WD touring cars, the RC10L3 Touring (L3T) is simply a different (and, on certain surfaces, a better) way to hustle a touring-car body around a racetrack. This new direction in the TC scene is sure to

polarize casual sedan buffs and dedicated racers alike; where will you stand?





### GRAPHITE AXLE

The lightweight Factory Team axle features an anodized diff flange and aluminum tip for a dash of color, but the anodizing could lead to diff-ring slippage with hotter motors. A special "short" diff hub keeps the rear end narrow enough to fit under a 190mm body, and a clamp-type left hub is supplied; both are constructed of T6 aluminum, so you know they're strong. The axle spins on standard pan-car  $1/4 \times 3/8$ -inch bearings, which are fit into variable-offset inserts to adjust rear ride height in the classic pan-car tradition.

### VCS SHOCKS

That's VCS as in "volume compensating system," Associated's new damper design. The heart of the system is an internal foam sleeve that absorbs the oil that is displaced as the shock shaft is pushed into the shock body. All three shocks incorporate the VCS design, and it works. Particularly satisfying are the lateral dampers, which I built into smooth performers on the first attempt; if you've ever assembled and reassembled a Delta-type micro-shock in an effort to get it somewhat close to feeling right, you know how impressive that is. The center shock is plastic, and a blue-anodized unit is available under Associated's Factory Team banner.

### GRAPHITE CHASSIS

The L3T's foundation is a slab of Associated's trademark glossy, woven graphite. Saddle packs are a must, and five slots per side allow plenty of battery-placement flexibility. And, uh, that's it. When I said this car is simple, I wasn't kidding.

### FACTORY OPTIONS

#### Blue aluminum

- chassis-brace standoffs—part no. 4442B.
- VCS micro-shock bodies—4471B.
- motor bulkhead—4537B.
- VCS macro-shock body—8450B.
- differential hub—8477B.
- Magnesium motor bulkhead—4538.
- Carbon-fiber left bulkhead—4541.

### YOU'LL NEED

- 190mm touring-car body.
- Motor.
- 6-cell saddle pack.
- Electronic speed control.
- Steering servo (high speed preferred).
- Transmitter and receiver.

### DYNAMIC-STRUT FRONT END

If you flip over to the "Oval Car Guide" in this issue, you'll find the same front end on eight of the 10  $1/10$ -scale cars featured. That's a pretty good indication of its effectiveness—on pan cars. The independent suspension of a 4WD touring car offers far more travel and much more tunable damping, but the Dynamic setup has all you'll ever need for carpet duty and smooth concrete and paved courses. Caster may be adjusted by relocating spacers on the upper arm's hinge pin, and camber is quickly dialed in via turnbuckles. Caster angle does not change with suspension travel when using 0-degree upper arm mounts, but by using the included 10-degree upper arm mounts, the front suspension can be set to deliver less caster as the suspension is compressed. Associated supplies steering blocks with trailing axles for forgiving steering, but these use E-clips to hold the front wheels—ugh.

### T-BAR SUSPENSION

The L3T relies on classic pan-car technology with a modern twist to suspend the rear pod. The fiberglass T-bar allows the pod to tilt to the left and right under cornering and uses a pair of lateral micro-shocks to resist roll. These shocks also adjust "tweak" by means of threaded spring-preload adjusters. The flexible T-bar also acts as a spring when the L3T goes over rough spots, and additional shock absorption and damping is provided by the large center shock.

### TITANIUM TURNBUCKLES

These are from the Factory Team hop-up line, but they're stock pieces on the Team edition kit. There's a smattering of matching blue hardware on the car to boot.

### JACO TIRES

Those would be the round black things on the corners of the car. Green-compound foam is spec'd, and Jaco's quality is well known. There are new-style, gray, composite wheels, and the front wheels have bearings.

### FOAM BUMPER

Big. Spongy. Included.

### TEST GEAR

- JR\* R-1 transmitter and receiver • Reedy\* Rage stock motor • Reedy Zapper 2000mAh matched cells • LRP\* ICS V6 speed control • Protoform\* Honda Accord 2-door body



## PERFORMANCE

I tested the L3T at a local club race, where I ran stock class with 4WD touring cars on carpet. The tight track looked more like a haven for 1/12 cars than big sedans, so I hoped the L3T would handle as precisely as I expected it to.

As an experiment, I sauced up the rear tires and left the fronts dry for my first run. I was curious to see just how much more traction the rear end of the L3T had compared to 4WD sedans, which usually require unsauced front tires to perform well.

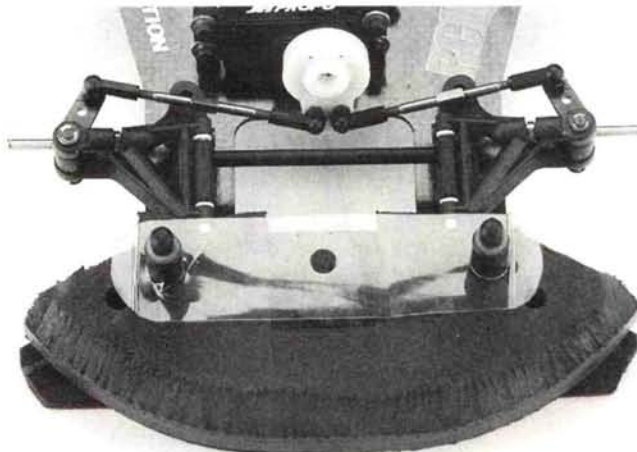
After the L3T snowplowed through the first turn, I took it off the track. With those giant steamrollers in the rear, there was no problem getting the power down, but the front end needed a dose of the sticky stuff as well. I painted some compound onto the inside halves of the front tires and went out again. This time, the car felt ready to race.

I'll spare you a blow by blow of each heat, but I will touch on a few things that stood out in my mind. First, the L3T is fast. Power-to-weight ratio, baby—at 38 ounces RTR, the L3T is a real featherweight. When starting from the back row, I easily jumped past 3 or 4 cars by the first turn.

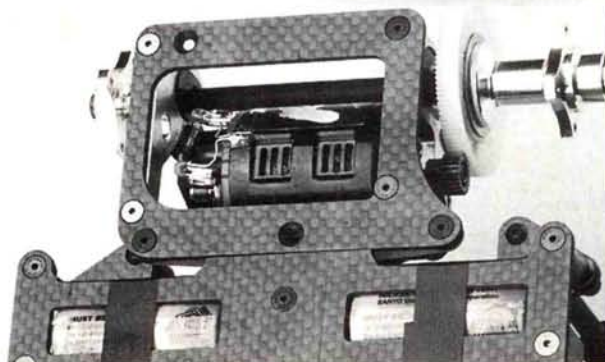
Second, I noticed that the L3T will lose a shoving match every time. If rubbin's racin' at your track, prepare to get nerfed if you run an L3T with the 4WD guys; their heavier cars simply have more mass to knock your car with. I discovered this firsthand because I was literally bumped out of A-main contention; but hey—that's racin'. In all, the RC10L3 Touring is inarguably the friendliest carpet car I've driven, mainly because it's so easy to dial in traction. Unless your track has some really strange carpet, most tuning will come from your tire-saucing strategy.

## IS IT FOR YOU?

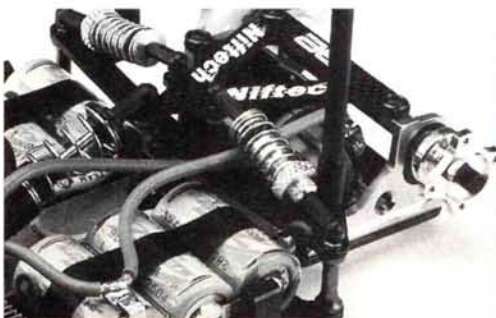
If your local track holds touring-car races on carpet, the RC10L3 Touring is the hot setup. As long as you have the room to open it up, you will be faster (to be fair, 4WD sedans will eat the L3T up on the typical bumpy parking lot). For considerably less cash than a comparably constructed 4WD tourer, the L3T offers scintillating performance with much less maintenance and much easier tuning. Four-wheel-drive buffs will scoff, but if, for you, the appeal of TC racing is based on the scale appearance of the cars, why not run a less expensive, more user-friendly chassis? If direct-drive tourers like the L3T take off, a class devoted to them could be a big hit, and this could revitalize the on-road carpet scene—especially if body-makers capitalize on the low-



**Check out my cheap-o transponder mount, which I cut from a motor blister pack. Titanium pivoted pins from Hammad Ghuman are just visible beneath the mount. Associated's stock wire pieces are functional, but the HG parts are way cooler.**



**Note the very fine gap between the motor pod and the chassis; a good whack from behind can slam the pod against the chassis, chipping the graphite plates. A little attention from a file or rotary tool will open the gap.**



**I couldn't resist adding a few hop-up parts to my car; the knurled preload adjusters are from IRS, and the aluminum left pod bulkhead is from Niftec.**

- Much higher power-to-weight ratio than 4WD tourers.
- Inexpensive, particularly for a top-of-the-line kit.
- Easy to assemble and tune.



- Batteries are held in with tape.
- Front wheels are held on by E-clips.
- Front body mounts are not adjustable.



slung chassis with appropriately low-slung GT1 and World Sports Car shells. (Anybody listening?). The performance of the direct-drive tourers merits the creation of a new class; I hope it happens. How can anyone argue with faster, cheaper, tougher?

\* Addresses are listed alphabetically in the Index of Manufacturers on page 209.

## BUILDING &amp; SETUP TIPS

■ Be sure to file the battery slots as described in the instructions. The more deeply you bevel the slots, the lower the cells will sit in the chassis. This will help to prevent the batteries from ejecting in a crash, and it will also lower the car's center of gravity. If you're a chronic board slapper, consider screwing cleats (use spare servo-mounting blocks or any scrap of plastic) onto the chassis through the unused holes alongside the battery slots.

■ To ensure consistent differential action, I pinned the diff with an Irrgang Racing\* kit. For cheap insurance, put a little silicone lube on the face of the diff flange before you install the diff ring. It seems illogical (lube to stop slippage?), but it works for milder motors.

■ Before installing the motor and rear wheels, spin the bare axle in the pod; even without the flywheel effect of tires, it should spin smoothly and continue to spin freely for a few moments just because of the axle's inertia. If it doesn't, check the bearings and ride-height adjusters to be sure they're fully seated. If they are and you still detect some binding, loosen the upper and lower pod plates' screws 1/2 turn, flex the pod assembly until the axle spins freely, then carefully retighten the screws a little at a time, checking the axle as you go.

■ The chassis plate has a short "tail" that falls just short of the rear pod. A rear-end collision can slam the pod's lower plate into the chassis and cause it to chip. To avoid this, file the "tail" down so that the gap between it and the pod is larger. Just knocking off 1/16 inch will do the trick.

■ The factory setup is spot-on for carpet; most of the fine-tuning will be done by applying traction compound. If you find yourself wanting less rear bite, try adding the third (center) screw to the rear pod; this will stiffen the T-bar slightly. If more steering is what you're after, optional in-line steering blocks are available for more aggressive handling.

■ The kit's instructions call for the front body posts to be mounted on the front bumper. Unfortunately, this caused the posts to exit the Protoform Accord shell through the headlights—not too attractive. I moved the body posts back by using them to replace the bumper's mounting nuts. However, the stock screws were a bit short for body-post duty so I installed larger screws (3/8 inch) from my spares box.



# Kyosho **Mooneyes** **Street Van**

by Louie Patterelli



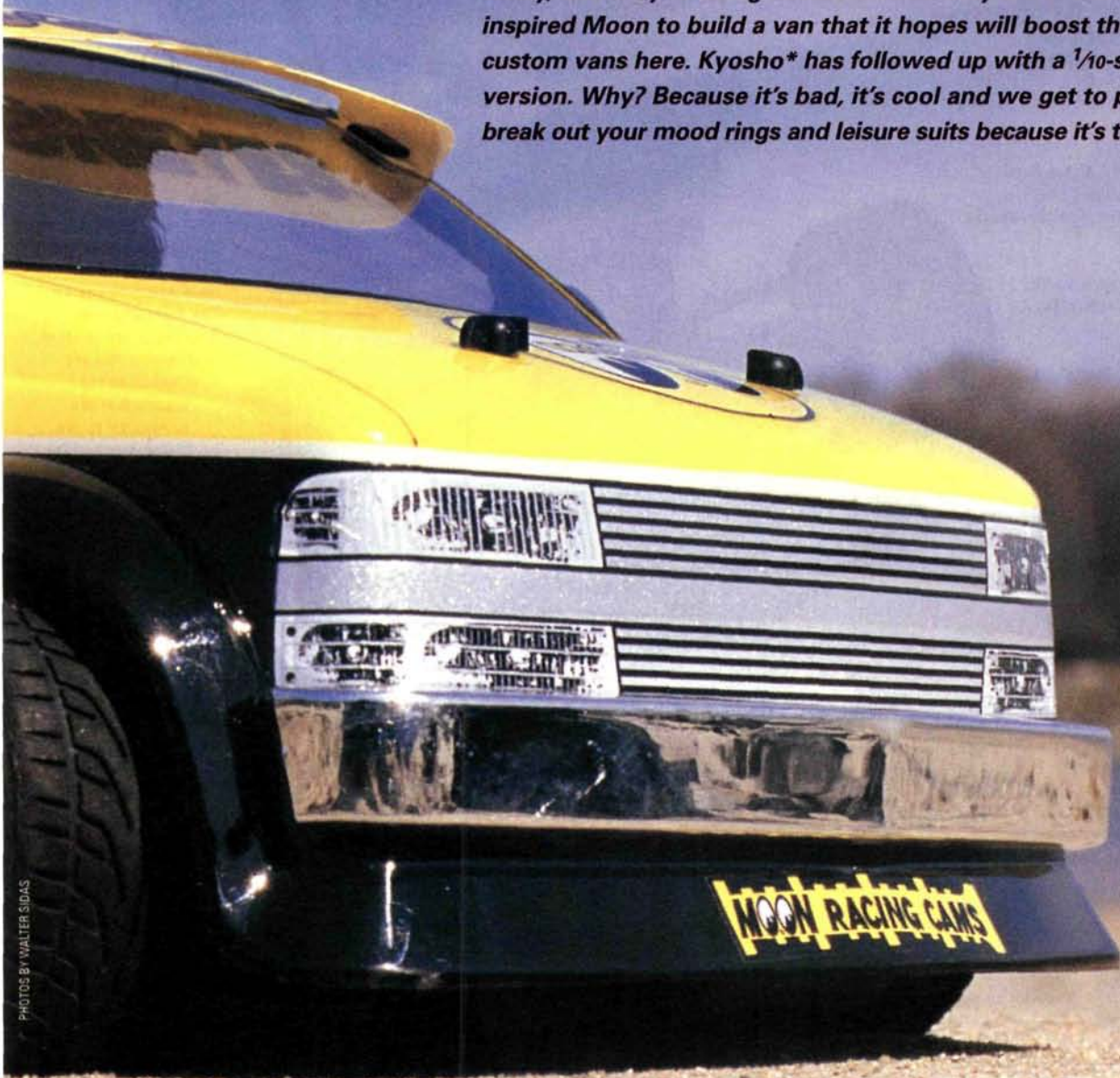


# THIS VAN'S A ROCKIN'

*Moon Equipment Co. has been a part of American hot-rod history for over 35 years, and it contributed to the custom-street-van craze. In the late '80s, when Dean Moon passed away, the company was purchased by his friend Shige Sugamuma, who carried on the tradition of this automotive performance icon and intro-*

*duced the Moon product line to Japan (the most recognizable product being the trademark spun-aluminum wheel disks).*

*The Chevy Astro and GMC Safari vans are extremely popular in Japan today, and they're being customized as they are in the States. This has inspired Moon to build a van that it hopes will boost the popularity of custom vans here. Kyosho\* has followed up with a 1/10-scale nitro-powered version. Why? Because it's bad, it's cool and we get to play with it. So, break out your mood rings and leisure suits because it's time to boogie.*







s p e c s

Scale 1/10  
List price \$399

**DIMENSIONS**

Wheelbase 11 in. (279mm)  
Width 9 in. (229mm)

**WEIGHT**

Gross, RTR 68 oz. (1,928g)

**CHASSIS**

Type Double-deck  
Material 2mm-thick aluminum plate

**DRIVE TRAIN**

Type Shaft drive w/two alloy bevel-gear diffs and QRC reversing transmission

Primary Clutch bell/spur

Drive shafts Dogbone-style

Clutch Centrifugal

Bearings/bushings Plastic and bronze bushing

**SUSPENSION (F/R)**

Type Lower A-arm w/fixed upper links

Damping Oil-filled, coil-over shocks

**WHEELS**

Type One-piece plastic with Moon disks

**TIRES**

Type SuperTen radials

**POWERPLANT**

Engine Kyosho GSX-11

Pipe Aircraft-style expansion muffler

Carb Rotary-barrel type

**A-ARM SUSPENSION**

You'll find very durable lower control arms and large-capacity, oil-filled shocks on all four corners. The shocks' one-piece shaft/plunger design helps speed up assembly (the shaft seals even come installed), and spring preload is easily set with a twist of the notched collars. The fixed upper links are great for beginners because they simplify assembly considerably. Those of us who can't leave well enough alone can easily install adjustable tie rods.

**REVERSING 4WD DRIVE TRAIN**

The Mooneyes street van uses a proven shaft-drive 4WD system to transfer the power to the front and rear bevel-gear differentials. Power is transferred to the wheels by means of steel dogbones that have proven to be tough. Kyosho's patented QRC (quick reverse clutch) transmission is mounted in line and dead center on the chassis, where it carries out its miraculous forward and reverse shifting functions. The reverse mechanism comes at the expense of brakes—the Mooneyes van doesn't have any!

**ALUMINUM CHASSIS**

The 2mm-thick-aluminum bottom plate provides a sturdy foundation for the drive train and suspension. The front and rear gearboxes are in stout bulkheads that are attached to top braces that are connected to the QRC tranny and the servo tray. Once all the components have been bolted together, you have a very rigid rolling chassis. The molded radio box—a direct transplant from Kyosho's 1/8-scale buggies—protects the receiver and receiver battery pack from the elements. A 75cc fuel cell holds enough go-go juice for lengthy run times. The bellcrank steering has a built-in servo-saver and an aluminum center link.

**.11 ENGINE**

Kyosho's GSX-11 pull-start nitro engine comes with a good-looking, machined-aluminum heat-sink head that helps keep the engine running cool. Fuel is managed by a rotary-type barrel carb with a single-needle mixture control that makes things a little easier for first-timers. The aircraft-style expansion-chamber muffler quiets the engine very effectively.

**HOT-ROD WHEELS AND TIRES**

The street-tread tires are the same as those used on Kyosho's potent SuperTen, and they're mounted on wheels that have special adapters to hold the realistic-looking Moon disks in place.



## PERFORMANCE

The Kyosho GSX-11 engine started on the first pull and settled into a nice burbling idle. After breaking it in, I leaned the carb out as suggested in the instructions and then let it rip. The GSX-11 has adequate torque and a crisp throttle response, but it lacks the punch you get from performance-oriented .12- and .15-size engines; what it lacks in brute power, however, it makes up for in ease of operation.

The Mooneyes van is big and heavy, so don't expect it to set any land-speed records, but it makes full use of what the engine has to offer. Acceleration is snappy, and even with the 4WD traction, doing donuts requires only a twist of the wheel and a squeeze of the throttle.

In tight corners, the van does lean, but the handling is always predictable.

And that brings us to something that isn't so predictable with a nitro-powered car: reverse. With Kyosho's ingenious quick reverse clutch (QRC) on board, getting stuck against a curb is a thing of the past. In a jam? Just push the throttle trigger forward and the fun continues ... backwards. The QRC is a durable unit that allows all kinds of anti-social stunts, including "Rockfords," in which you go at full speed in reverse and then crank the steering wheel to swing



*This ingenious throttle-cam gizmo is another component of the QRC system. It allows full throttle control in both forward and reverse by closing the throttle when the servo is at neutral and opening it when the servo moves past neutral in either direction.*

- Very high cool factor.
- Good quality.
- Reverse. Need I say more?



Likes

- Slightly under-powered.
- The quick reverse clutch is noisy when transitioning from forward to reverse or vice versa.
- No brakes!



dislikes

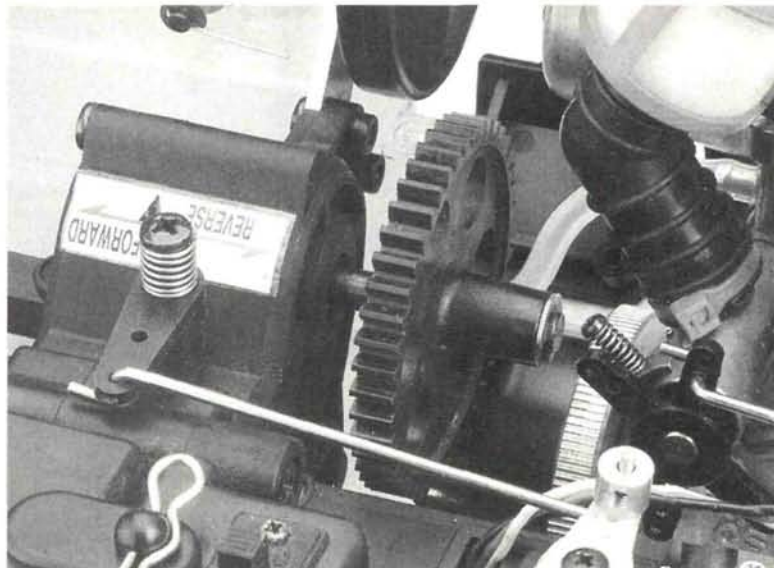
the nose around and then nail full throttle forward. It's easy to pull off all kinds of tricks.

## FINAL THOUGHTS

Although the engine is a little on the small side, the Mooneyes van is good for a quick trip down memory lane. That's really what it's all about—having fun and perpetuating the carefree lifestyle that custom cars and hot rods embody.

Just think what a cool towing vehicle it would make for the tricked-out, nitro-powered touring car you've been dreaming about. Even cooler is that you can reverse it into its parking space.

*Here's the QRC tranny, which enables the Mooneyes van to travel backward—something no other nitro-powered car can do. The QRC unit is essentially two transmissions in one: the sliding locator arm simply engages the "forward" or "reverse" set of gears.*



## BUILDING &amp; SETUP TIPS

Building is very easy thanks to Kyosho's excellent instruction manual. The only area that requires your utmost attention is the assembly of the throttle linkage; it has many small parts, so make sure your work area is clear and your patience is in good supply.

■ Kyosho uses press-on hex hubs instead of conventional drive-pin axles. While this makes a very strong axle, you do have to tighten the wheel nuts down as hard as you can to prevent the hex drive from slipping on the axle. You should also make sure that you do not get grease on the tapered part of the axles when you insert them into the bushings.

■ The engine-cooling fan is a nice touch, but to make absolutely certain that fresh air is moving around inside the body, drill a row of holes across the top of the windshield behind the visor.

■ The stock ride height offers plenty of ground clearance for rough roads, but for the best handling, install spacers inside the shock bodies to lower the ride height a little.

■ Set the neutral point of the throttle servo very carefully, or the QRC tranny will be very noisy as the shift bar bounces off the forward or reverse gear.

■ Nitro vehicles vibrate a lot, so be sure to check the screws periodically and put a drop of thread-locking compound on all the screws that go into metal.

## YOU'LL NEED

- 2-channel radio system with two servos, receiver and receiver battery pack.
- Glow-plug igniter.
- Thread-locking compound.
- Lexan-compatible paint.
- Fuel (10-to 20-percent nitro recommended).
- Fuel bottle (not necessary, but highly recommended).
- CA glue for the tires.

## FACTORY OPTIONS

- 5x10 bearings—part no. 1901.
- 5x8 bearings—1902.
- 8x4 bearings—1911.
- Fuel filter—39308.
- Urethane front bumper—39401.
- SuperTen ball diff—39507.
- SuperTen high-ratio ring gear for ball diff—39508.
- Vespe clutch shoe—39672.

Thanks, Kyosho, for reminding us how cool hot-rodding was and is.

\*Addresses are listed alphabetically in the Index of Manufacturers on page 209.





# Tamiya FF02 Peugeot 306 Maxi

by Doug Mertes

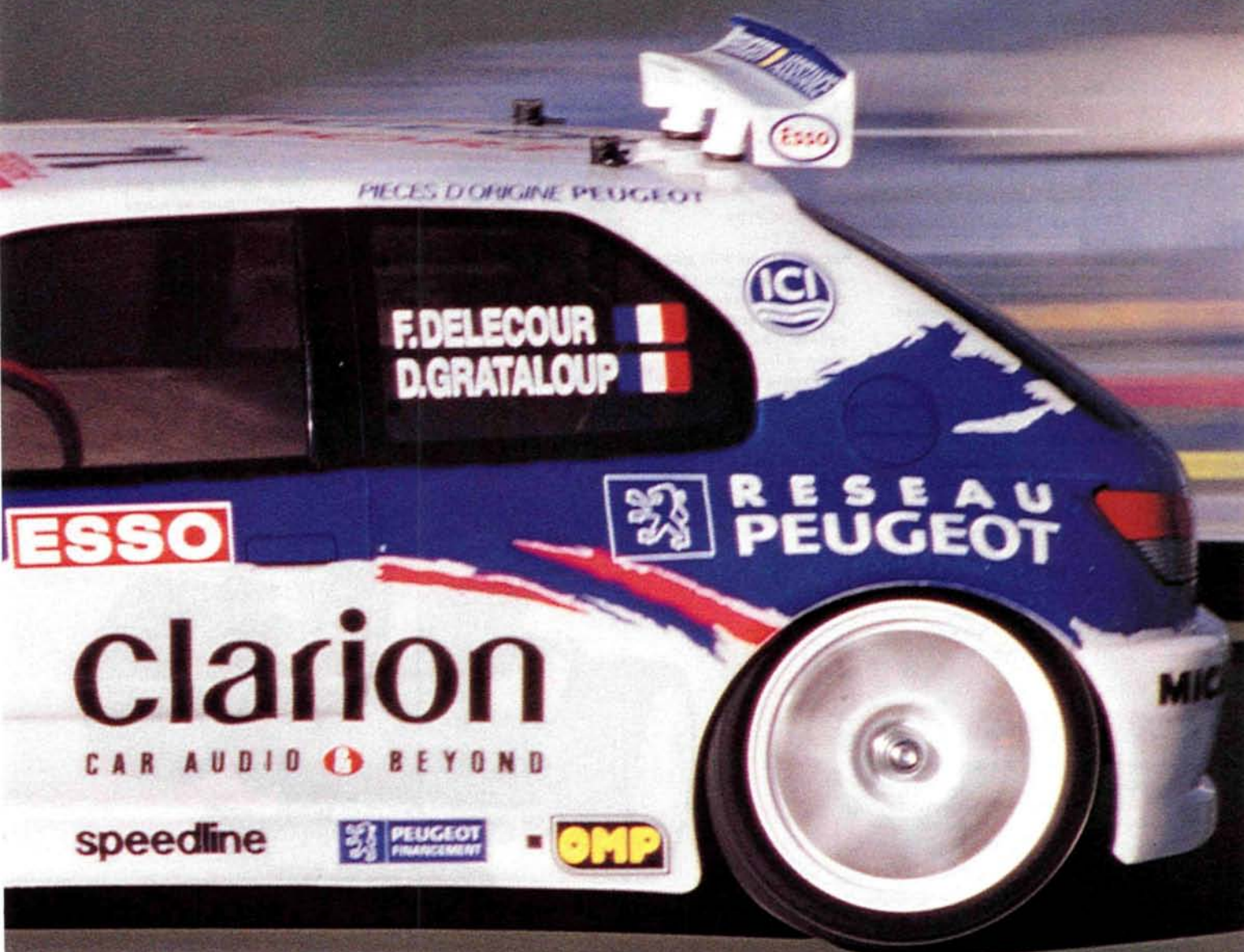
**Y**ears ago, shortly after the sedan movement started to gain momentum in the U.S., Tamiya\* had to make a decision: should it design pro-level touring cars for the high-performance market or sell sedans based on existing full-scale technology? At the time, the four-wheel-drive (4WD) street cars had been introduced to a driving public whose response was lukewarm at best. On the other hand, performance-oriented front-wheel-drive cars (FWD) were becoming more and more popular. To its credit, Tamiya made a wise choice and offered both 4WD (TA02 series) and FWD platforms (TA02FF). Although the intervening years have seen the popularity of 4WD R/C touring cars far exceed that of FWDs, there are enough stalwart front-drive fanatics out there for Tamiya to update its aging FF design. The new FF02 chassis is based on an interesting combination of M03 Mini and TL01 sedan parts, and it illustrates how Tamiya's design team makes the most of their engineering efforts.



# FRONT

PHOTOS BY WALTER S.





# runner





## s p e c s

SCALE 1/10  
LIST PRICE \$119

**DIMENSIONS**  
Wheelbase 10.19 in. (259mm)  
Width (F/R) 7.25 in. (180mm)

**WEIGHT**  
Gross, RTR 49 oz. (1,389g)

**CHASSIS**  
Type Molded monocoque  
Material High-performance plastic

**DRIVE TRAIN**  
Type Gear  
Primary Pinion/transfer  
Drive shaft Dogbone  
Differential Gear  
Slipper clutch None  
Bearings/bushings Plastic bushing

**SUSPENSION (F/R)**  
Type Lower A-arm w/fixed-length upper link  
Damping Coil-over shocks

**WHEELS**  
Type One-piece molded plastic  
Dimensions (DxW) 2.07x1 in.  
(52.6x25.4mm)

**TIRES**  
Type Tamiya semi-slick w/sponge liners

**ELECTRICS**  
Motor 540 stock  
Battery Not included  
Speed control 3-step mechanical w/reverse

## YOU'LL NEED

- 2-channel radio and receiver.
- Two servos for throttle and steering, or one servo and an ESC (preferred).
- 6-cell stick-type battery pack.
- Polycarbonate-compatible paint.
- CA glue.

## FACTORY OPTIONS

- Adjustable upper links—part no. 53303.
- Universal drive shafts—53115.
- Bearing set—53348.
- Swaybar kit—53324.
- Ball differential—53267.
- Super-low-friction dampers—53280.

## SEMI-SLICK TIRES

The kit tires are long wearing and work well with the kit motor on most asphalt surfaces. Slip in a hotter powerplant, and you'll need to upgrade the tires to maintain traction. Fortunately, the FF02 accepts all brands of sedan tires and wheels.

## MONOCOQUE-TYPE CHASSIS

The FF02 chassis probably looks familiar to minicar fans; it's identical to the unit found on the latest M03 Mini. The 2-inch extender between the front and rear halves is unique to the FF02 and brings the wheelbase out to a sedan-length 10.19 inches. The fully boxed chassis resists torsional deflection very effectively, uses less material and takes up less space than the older tub design. There's not much room for electronics unless you line them up along the top, but that puts the weight higher than competitive racers would like. A small receiver or an ESC can be placed inside the chassis between the halves of the rear section. Rigid bumpers are found at both ends of the chassis.

## IMPROVED BODY POSTS

This new body-mount system, first seen on the TL-01, works with the ultra-short WSC bodies but can also be adapted to fit virtually any sedan body in Tamiya's extensive catalog.

## TWO-PIECE SUSPENSION ARMS

The "clamshell" type front and rear suspension arms, drive shafts and one-piece upper links are borrowed from Tamiya's successful entry-level TL01 series. These parts have demonstrated superior strength on that all-wheel-drive sedan and should last for the life of the car.

## EFFICIENT GEARBOX

Identical to the Mini M03's, this contains a gear differential but limits tuners to a choice of three gearing options. A ball diff from either of Tamiya's 4WD sedan series will fit. With one spur, one transfer and a diff gear, this is a highly efficient reduction unit.

## DIRECT-LINK STEERING

The servo-mount design reduces (but doesn't eliminate) the slop caused by multiple steering-linkage connections. There's no need for expensive hop-up metal steering linkage, although turnbuckles would make toe adjustments easier.

## FRICTION SHOCKS

Coil-over shocks without oil damping may make purists sniff, but they're easy to assemble, do a pretty good job and keep the cost of the kit acceptable to those interested in low-buck driveway racing. A full range of shocks and other hop-ups are available for racers seeking more adjustability.

## TEST GEAR

- Futaba Magnum Sport transmitter and receiver
- Novak Reactor ESC
- Trinity\* Paradox Pro motor (not shown)
- Tamiya 1400 SP battery pack
- Futaba 9101 steering servo



## PERFORMANCE

Although the Maxi is modeled after Peugeot's successful FIA World Rally car, I'd hesitate to drive it off-road unless the track is set up specifically for rallying and is smooth and relatively flat. The FF02 can't deal with the huge jumps and rough terrain found on most U.S. dirt tracks, but its FWD handling characteristics make it a natural for running on asphalt with 4WD cars. Most parking-lot race directors mix FWD and 4WD racers in the same class, although some separate them if there's a large, enthusiastic FWD contingent. In the Tamiya Championship Series, this car would race with a stock motor in GT2.

I found the Maxi fun and competent during quick lunchtime practice runs in

## BUILDING &amp; SETUP TIPS

Like all Tamiya kits, everything came nicely packaged, and the instruction manual is first-rate; just pay attention and take your time!

■ No special tools are required, but I suggest you purchase a high-quality set of Phillips screwdrivers. Quality tools make assembly a pleasure and minimize screw-head wear.

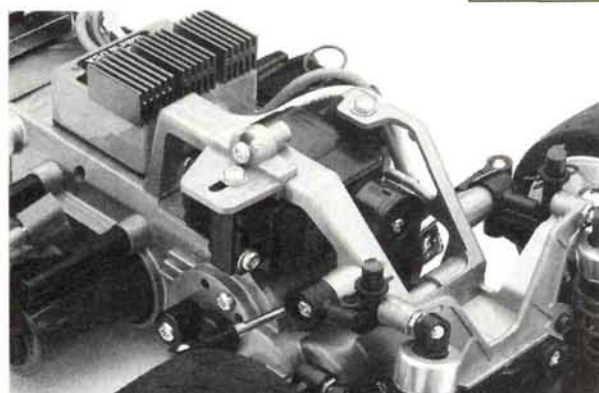
■ Tamiya supplies enough grease for the gear diff and the rest of the car's rotating parts, but I used Aero-Car\* Super Speed gear lubricant on the tranny gears instead of the heavier kit lube.

■ Since there aren't any alternative locations for the shock mounts, all you have to worry about is the wheel camber relative to the car's ride height. If you lower the chassis (something I strongly recommend), be sure to install adjustable upper links that are long enough to result in 1 to 1.5 degrees of camber. If you stick with the kit's upper links, the shocks must be at least 51mm when fully compressed, or you could crunch the drive shafts.

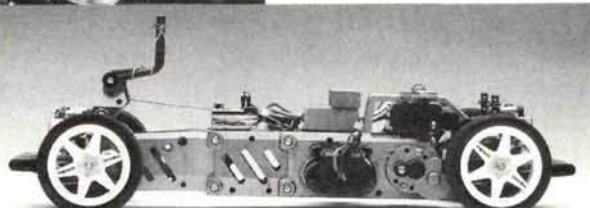
■ Place rubber O-rings on the external portion of the shock shaft so that the car doesn't bottom out and scrape the chassis on the pavement. Tamiya's tuned springs are another valuable tuning aid; just be sure that the front springs are stiffer than the rears, or the car may spin out in the turns.

■ This year's Tamiya Championship Series rules allow racers to discard the ubiquitous but inefficient Tamiya battery plugs and bullet motor connectors. I hard-wired the motor to the ESC and installed a Deans\* battery plug for maximum power. The Tamiya 1400SP sport pack is swell for bonkin' around and practice, but I've reserved better batteries for racing.

■ I installed an expensive Futaba 9101 steering servo, but it's overkill for this application. An S148, 3003 or other "standard" servo would be just fine on most parking lots.



The steering servo is mounted beneath a roll cage-like arrangement that incorporates a slotted fin to accommodate a range of servo sizes. The kit-supplied servo-saver is linked directly to the hubs.



Above: note the extender that transforms the Tamiya's second-generation mini-chassis into a "full size" 1/10 car. Left: the two-piece suspension arms are TL01 pieces. The link on the front of the arm is part of an optional swaybar kit.



- Low weight and simple design.
- Less steering slop than previous FF chassis.
- Better handling than the original FF design.
- Requires minimal maintenance.

👍 Likes

- Cheesy friction shocks.
- Only three pinion choices.
- Electronics must be mounted high on chassis.

👎 dislikes

the office parking lot. Likewise, the neighbors enjoyed taking the wheel during a Saturday test session in front of my home. If you use the "toss it and hang on" 4WD driving style, however, you'll have to develop a different technique to hustle a front driver around the cones. Unlike its all-wheel-drive cousin, chopping the

throttle in the middle of a corner causes the FF02 to push and drift wide. Finish braking before you go into a turn, apply power smoothly through the corner, and you'll be rewarded with low lap times. The supplied shocks, fixed upper links and semi-slick tires did an adequate job when used with the Mabuchi motor. Go much beyond that power level to a hot stock or mild modified motor, though, and you'll have to upgrade some of the equipment to get the most out of the car.

\*Addresses are listed alphabetically in the Index of Manufacturers on page 209.

## A Faster FF02

The new TCS rules bring the United States into line with the rest of the world, which stopped running separate FWD and 4WD classes after the 1997 season. I was a little surprised when I heard that Tamiya had eliminated the separate front drive class, especially since it was the largest one at the 1998 U.S. Nationals. This year, I expect that diehard FWD racers who are interested in national-level competition will gravitate to Tamiya's new GT2 category. This new class mandates stock motors but allows any Tamiya hop-up or tires but doesn't require the use of Tamiya battery plugs or bullet connectors on the motor wires. Knowing that, I set up the Maxi with a few select upgrades just to see how well it would fare with a stronger powerplant.

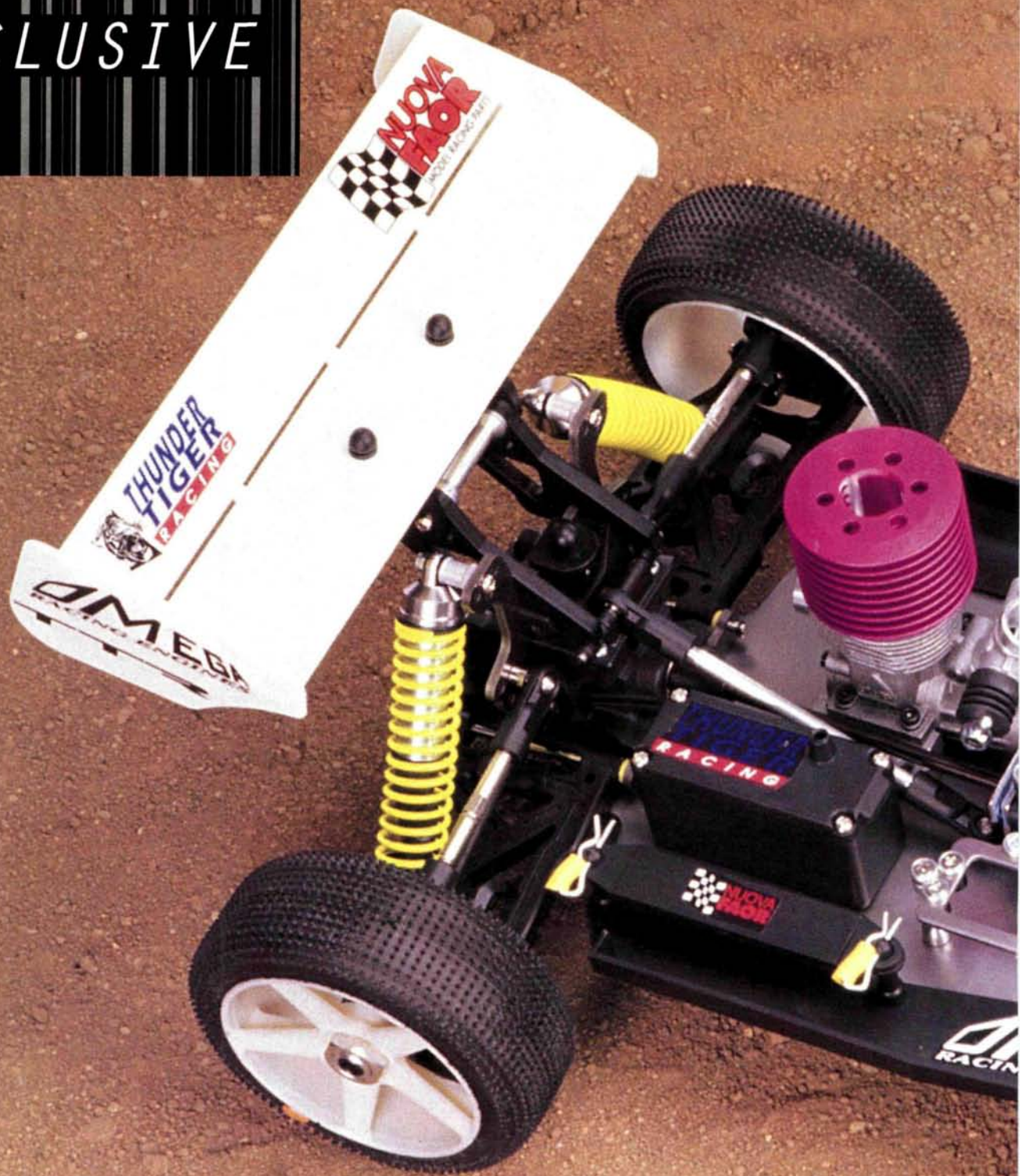
With the installation of adjustable upper links, Type A slicks with blue inserts, a set of Super Low Friction dampers (60WT shock oil and blue springs up front; 40WT and red springs in the rear), universal drive shafts, bearings, a ball differential (the older Manta Ray/TA-02 and the newer TA-03 type will fit), a rear swaybar kit from the TL-01 and a Trinity Paradox Pro rebuildable motor, the Maxi really came alive. Equipped with a 16-tooth pinion, the motor provided more than enough power. A Novak\* Reactor speed control (love that reverse lock-out for racing!), Futaba\* 9101 steering servo and Tekin\* receiver complete the electronics.

Set up with these improvements, the Maxi can now be adapted to virtually any surface or course configuration. My track testing confirms my initial impressions: given a little tuning time and a talented driver, this car can give fits to the stock-powered 4WD sedans on the parking lot!



EXCLUSIVE

THUNDER TIGER



# PR5

by Steve Pond



# THUNDER TIGER GOES ALL OUT IN $1/8$ SCALE

## SPECIFICATIONS

- Wheelbase: 324 to 329mm
- Average weight: 3,300g (approx.)
- Front
  - track width: 260 to 268mm
  - caster: 18 to 25 degrees
  - chassis kick-up: 5 degrees
- Rear
  - track width: 261mm
  - toe-in settings: 1, 1.5 and 2 degrees
  - anti-squat: 2 degrees

WE WERE GIVEN OUR FIRST GLIMPSE OF THE THUNDER TIGER\* EB-4 PROTOTYPE, THEN TENTATIVELY NAMED THE EBX-04, IN NOVEMBER '98. IT WAS SLATED TO BE THUNDER TIGER'S FIRST FORAY INTO THE WORLD

OF  $1/8$  COMPETITION OFF-ROAD BUGGIES. THUNDER TIGER IS FAIRLY WELL-KNOWN FOR ITS MIRAGE AND MIRAGE V-SPEC CARS, WHICH MANY BELIEVE OFFER AN IDEAL BALANCE OF PERFORMANCE, DURABILITY AND ECONOMY FOR ENTRY-LEVEL UP TO CLUB RACING. THE EB-4, HOWEVER, BREAKS THE THUNDER TIGER MOLD AND JUMPS HEADLONG INTO THE COMPETITION MARKET THAT, AT LEAST IN THE U.S., HAS BEEN DOMINATED BY KYOSHO AND MUGEN. OUR EXCLUSIVE CLOSE-UP OF THE NEW EB-4 REVEALS THE DETAILS OF THE FINAL PRODUCTION CAR.

## News flash!

**Thunder Tiger  
EB-4 wins at  
Silver State ...**

Richard Saxton TQs and wins  
Silver State Nitro Challenge  
with EB-4 on its first outing!





The EB-4's original design came from the fertile mind of Franco Sabattini—a well-respected member of the 1/8 off-road racing community. Sabattini has consulted for companies such as Serpent, Picco and NovaRossi, and he served as team manager for Crono, a noteworthy manufacturer of 1/8 off-road cars in Europe.

From the ground up, this competition-class buggy is almost an entirely new design. It's built on a 3mm-thick, flat aluminum chassis plate that doesn't have the familiar channeled sides of the Kyosho and Mugen cars, but it looks plenty strong enough as is. It includes a total of 5 degrees kick-up in the front end for bump handling; both sides of the chassis have protective side guards; and new differentials are featured at the front, center and rear.

The new diffs are of a bevel-gear design (instead of the planetary gears found in previous Thunder Tiger cars). The diffs include six conical gears to withstand the rigors of competition. The diff housings are made of plastic, much like Kyosho's differentials. Plastic isn't bad; it just doesn't typically allow the precise gear mesh that's available with machined-aluminum diff housings. Thunder Tiger chose plastic housings for the new car, but they're machined plastic instead of molded, and that offers the same precision as aluminum housings. All three of the EB-4's housings are sealed to allow the use of viscous fluids for tuning differential action.

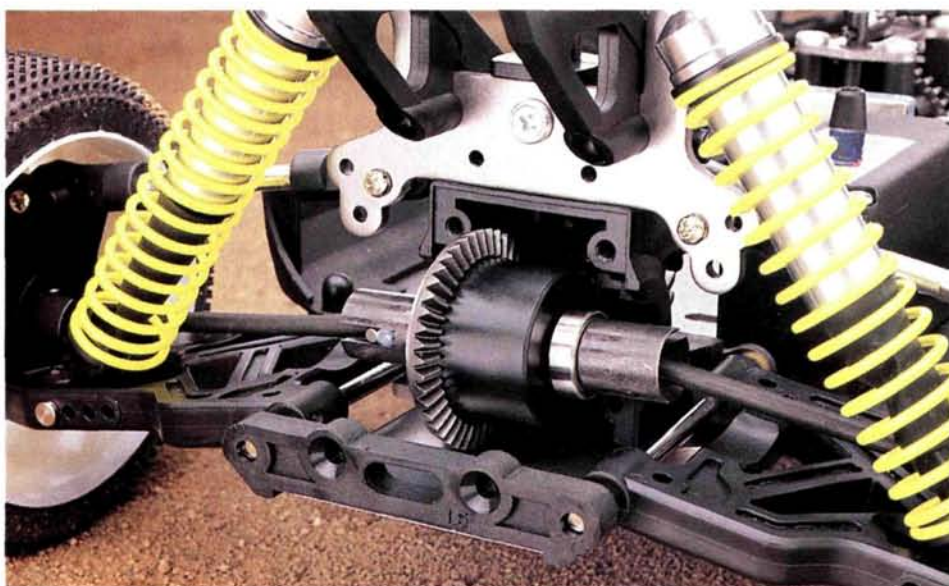
The EB-4's suspension is, as you may have guessed, also entirely new. The front

may be adjusted from 260mm up to 268mm. To alter width, you have to take the lower A-arm off the steering hub, but you can change the upper arm length with the twist of a turnbuckle.

The lower suspension arms exhibit very slight flexing, which can save your bacon in a collision, but their most visible attribute is that they're the beefiest arms ever seen on an 1/8-scale competition buggy. Their extra heft might incur a slight

uses a cast-aluminum steering hub that's attached to the suspension arms with large pivot balls. This design variation allows quick caster-angle and front-track changes.

The EB-4's rear sports the same beefy construction in the lower suspension arms. Instead of upper A-arms, upper links are used; this allows greater flexibility of the rear suspension geometry. The rear arms are fixed at 2 degrees of anti-squat, and the track is fixed at 261mm, but the wheel-



**The front and rear diffs are accessed by removing eight screws. The diff housings separate in a manner that leaves the shock tower and suspension components in place. This reduces downtime when performing maintenance. The machined plastic diff housings are lightweight and allow a more precise gear mesh by minimizing runout in the ring gear.**



**The front-suspension design allows quick caster adjustments by repositioning the C-clips that shim the upper suspension arms. Note the three Ackerman positions for the steering linkage.**



**The center diff features a metal gear for durability and a pair of steel brakes for stopping power. The rather plain-looking stamped steel disks aren't as pretty as the vented ones found on Kyosho and Mugen buggies, but they get the job done.**

end features a double A-arm setup that may be adjusted in almost every direction. Caster angle is easily adjusted by repositioning the C-shaped upper A-arm shims.

Caster angle ranges from as low as 18 degrees up to 25 degrees, and front width

penalty in the unsprung weight department, but they look as if they'll be very hard to break.

A trained eye will notice that there is no C-carrier at the end of either of the front suspension arms. The EB-4's design simply

base, toe angle and camber are all adjustable. The recommended rear toe-in is 1.5 degrees, which is set by selecting the proper rear hinge-pin brace. For more tuning options, Thunder Tiger also includes 1- and 2-degree rear toe plates.





**The rear suspension comes with standard dogbone drive shafts. The lower suspension arms are so beefy they could be considered excessive, but it's doubtful you'll ever need to worry about breakage. Note the four lower shock-mounting positions for added tuning options.**

Shims much like those used to set the front caster angle are used to position the rear hub carriers for wheelbase settings that range from 324 to 329mm. The camber links are turnbuckle tie rods, as are all the EB-4's other linkage rods.

All corners are equipped with oil-filled coil-overs of an appropriate size for the rigors of 1/8 racing. The shocks appear to have a chrome-type finish that is undoubtedly intended to smooth operation. They're attached to a pair of aluminum shock towers that use beefy-looking aluminum bushings and result in a very solid mounting system.

chassis plate between the engine and the radio box while the front rod is attached to the center diff brace.

The new radio box is a sealed design with an external receiver-pack mount. The pack is installed in a laydown fashion, which helps keep the center of gravity low. Receiver packs ranging from 600 to 1100mAh will fit under the external mount.

The center diff is mounted in the center of the chassis between a pair of uprights that also serve as a mount for the standard



**The front suspension doesn't have C-carriers for the steering hubs. The ball ends are mounted directly on the hub instead. Similar designs by other manufacturers were prone to breakage, but according to Thunder Tiger, these parts have held up very well in testing.**

The top of the chassis is fitted with a pair of torque rods that extend to the front and rear differential housings. The rear torque rod is attached directly to the

steel disk brakes.

To the left of the center diff is a 125cc fuel tank. The tank shown here was borrowed from a Thunder Tiger Mirage V-spec because the production unit wasn't ready at press time, but the standard EB-4 tank will have the same 125cc capacity and a cap-mounted pressure fitting.

On the right side of the center diff is the aluminum servo tray, which is mounted on the chassis with aluminum posts for more rigidity.

As a competition vehicle, the EB-4 comes without an engine and exhaust system to leave the choice to the racer. It

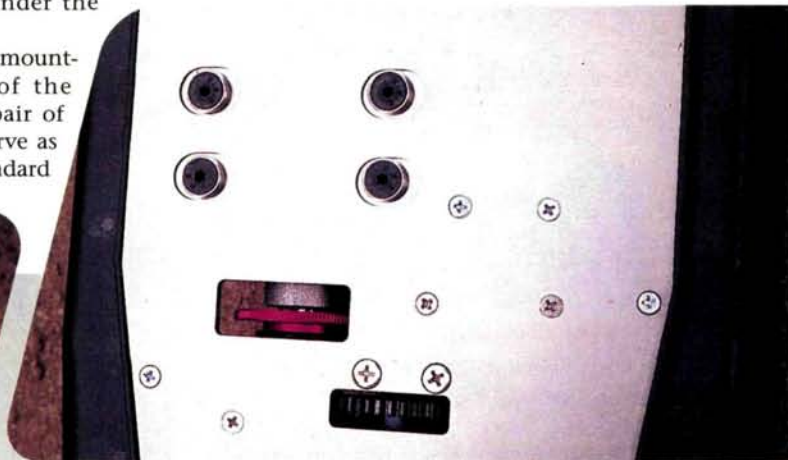
does, however, include a pair of universal engine mounts, a standard-weight flywheel and a spring-loaded three-shoe clutch. A pair of ball bearings instead of needle bearings supports the clutch bell. While I'm on the topic of bearings, the EB-4 is scheduled to include a full set of long-lasting rubber-sealed bearings instead of the more vulnerable metal-shielded bearings included in other competition kits.

Last but not least, the EB-4 will be the only competition class car to include a set of wheels and tires and a wing. The wing is standard fare for an 1/8 car, and the wheels are a sharp-lookin' 5-spoke design. Instead of standard TT rubber, Thunder Tiger will include a full set of Ellegi tires.

## FINAL THOUGHTS

The EB-4 is certainly the most competition-ready vehicle that Thunder Tiger has ever built. It has many of the right ingredients to compete at the highest levels of competition.

The EB-4's standouts are that it includes the basic equipment—minus engine, exhaust system and radio gear—to get it on the track, and it's expected to come in at a lower price than any of the other competition kits in the States—a



**This bottom view reveals the engine-mounting screws protruding slightly below the chassis plate. The rest of the fasteners, however, are flush with the bottom of the chassis.**

possible list price of \$749—and could hit the street for somewhere between \$350 and \$400.

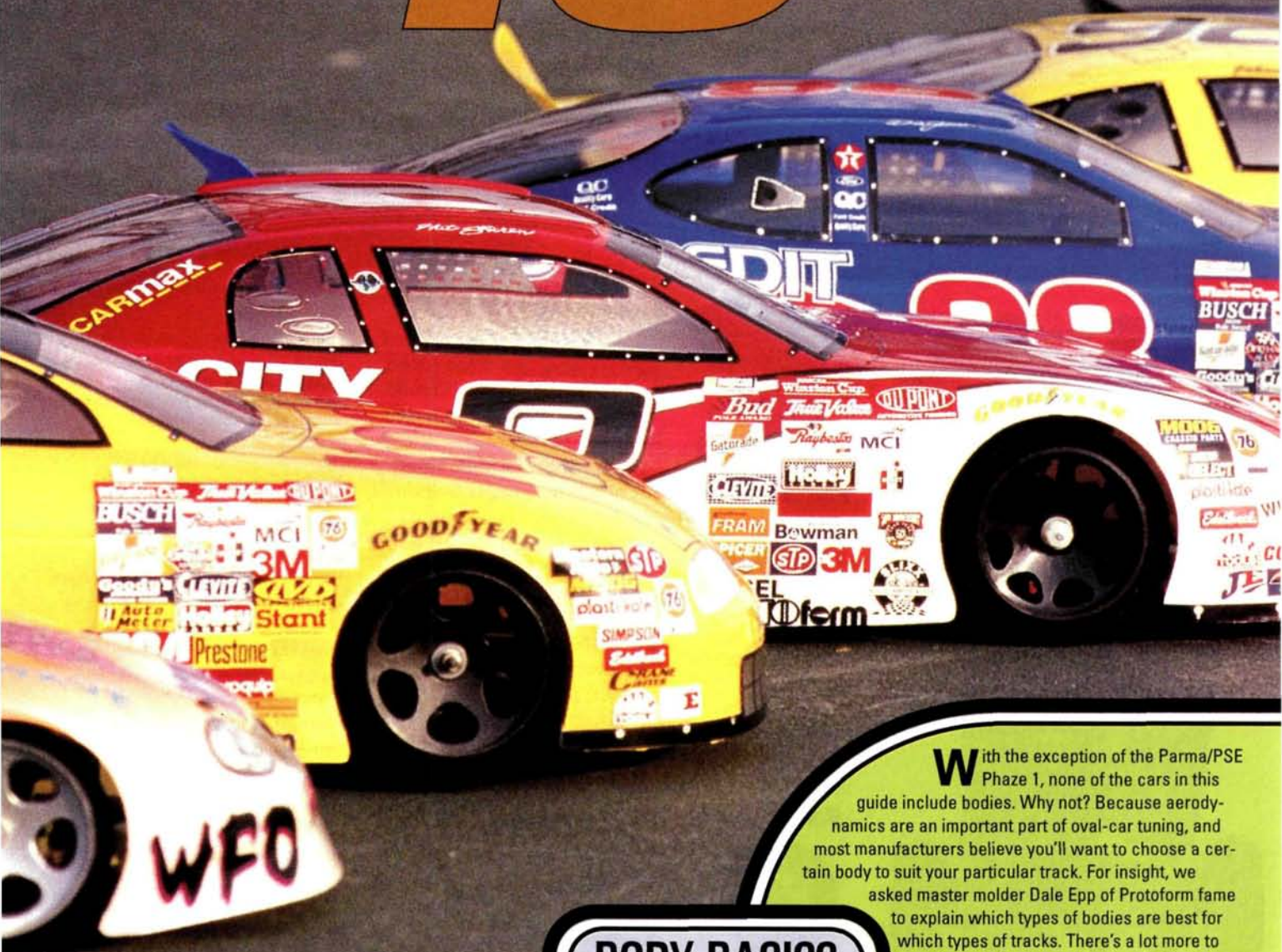
Its components don't appear to have the competition "polish" seen in the well-established Kyosho and Mugen cars, but looks aren't always everything. If the EB-4 runs as well as its features and geometry suggest it should, then Thunder Tiger could be well on its way toward challenging the establishment in 1/8 off-road racing.

*\*Addresses are listed alphabetically in the Index of Manufacturers on page 209.*



# Ten ways to turn left

PHOTOS BY WALTER SIDAS



## BODY BASICS

**W**ith the exception of the Parma/PSE Phaze 1, none of the cars in this guide include bodies. Why not? Because aerodynamics are an important part of oval-car tuning, and most manufacturers believe you'll want to choose a certain body to suit your particular track. For insight, we asked master molder Dale Epp of Protoform fame to explain which types of bodies are best for which types of tracks. There's a lot more to aerodynamic tuning and body selection than we can fit here, but this will get you started. Here's Dale:

### HIGH-SPEED BANKED OVAL

A lot of downforce is generated by the speed of the cars due to centrifugal "G-loading" against the banking. A body that generates too much aerodynamic downforce on these types of tracks is inefficient, and the drag (a byproduct of downforce) will



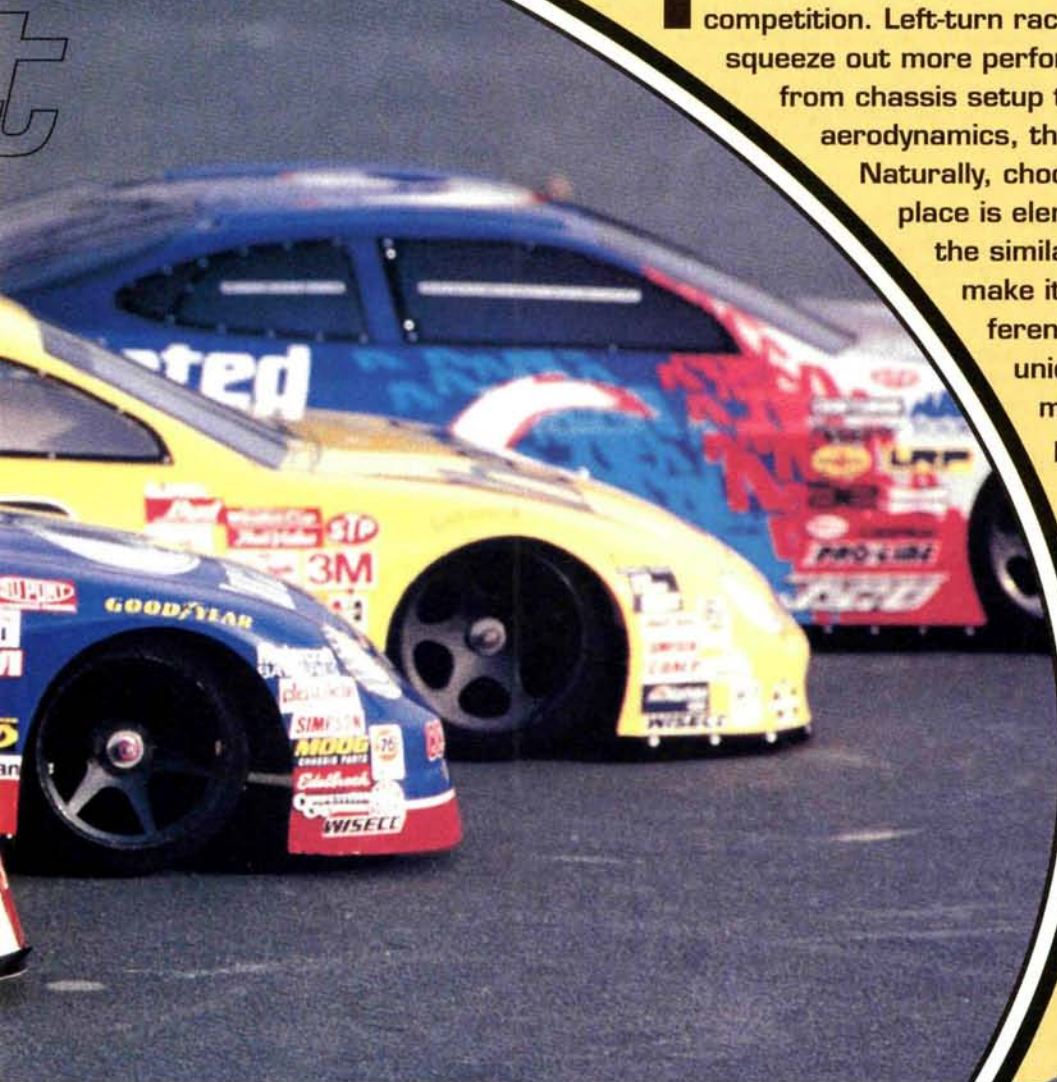
# OVAL CAR GUIDE

by Peter Vieira

If "go fast and turn left" describes your brand of racing, you already know that everything counts in oval competition. Left-turn racers look for any way to squeeze out more performance from their machines; from chassis setup to electronics choices to aerodynamics, they don't overlook a thing.

Naturally, choosing the right car in the first place is elemental to success; however, the similarity of oval machines can make it difficult to quantify how different the cars really are. The unique personality of each car is measured in each fraction of pod offset and each gram of graphite. In oval racing, it's all in the details.

That's where this guide comes in. We've gathered the 10 top ring-runners and analyzed them inside and out so you can see where and how the top cars differ, as well as the winning traits they share. Go fast, and turn the pages to the left!



reduce straightaway speed. Bodies with low frontal area and good balance are essential here; the Protoform Monte Carlo 1209L, Grand Prix 1214L and Taurus 1216L were designed for this type of track.

## LOW BANK/NO BANK CARPET OVAL

A good chassis setup will usually develop strong bite on carpet, so the bodies mentioned above (and similar designs) can also work well here. But on tracks with little or no banking and/or a low-grip surface, a body with a low, wide nose, a few extra degrees of "rake" (also known as "angle of attack") and an aggressive spoiler is best. These all contribute extra downforce to the car. Try the Protoform Pontiac 1208L, T-Bird 1212L, or Taurus 1217L.

## VELODROME-TYPE HIGH-SPEED OVAL

On these superfast tracks, aerodynamic tuning is critical. Bodies with a small frontal area, smooth, almost blunt front ends and zero angle of attack are the ones to use. Spoilers may sometimes be eliminated entirely. The body should be constructed of 0.040 Lexan and rigidly mounted to avoid distortion at high speed. The Protoform T-Bird 1210R and Monte Carlo 1215R are proven velodrome champions.





# ASSOCIATED RC10L30

help lighten the chassis plate, and three slots are available for right-side battery installation. Predrilled holes permit you to install a standard-size steering servo, and an additional body-post hole is provided for hood support.

## REAR SUSPENSION

A T-plate secures the pod to the chassis, and three shocks provide damping for bump and roll forces. The aluminum lateral shocks feature threaded preload adjusters for easy tweak changes while the composite center shock uses preload clips. All three shocks feature Associated's volume compensating system (VCS) design, which relies on an internal foam sleeve to absorb oil displaced by the shock shaft. The shocks are easy to build (and build well!). The rear pod uses graphite upper and lower plates supported by an aluminum motor plate and composite plastic left-side bulkhead. The pod may be offset 1/4 inch to the left by using an optional set of mounting holes.

## FRONT SUSPENSION

Associated's Dynamic Strut setup is supplied here and is used by many other manufacturers as well. The popular front end is adjustable for caster and camber and can be built with active caster (in which caster angle becomes steeper as the suspension is compressed) or standard, fixed caster. In-line axles and blue titanium turnbuckle tie rods are included.

## AXLE

A solid graphite axle is supplied, along with a clamping left hub. The nicely finished diff hub is not pinned, and this is unfortunate, as the blue-anodized diff flange allows the diff ring to slip. To reduce weight, both hubs are relieved between the wheel-mounting lugs. A blast-from-the-past 48-pitch spur gear is supplied.

## OTHER STUFF

Pro-Line/Jaco tires are supplied (greens all around), as are a Kimbrough servo-saver, blue-anodized hardware and Associated's ample foam bumper.

## WHAT'S HOT

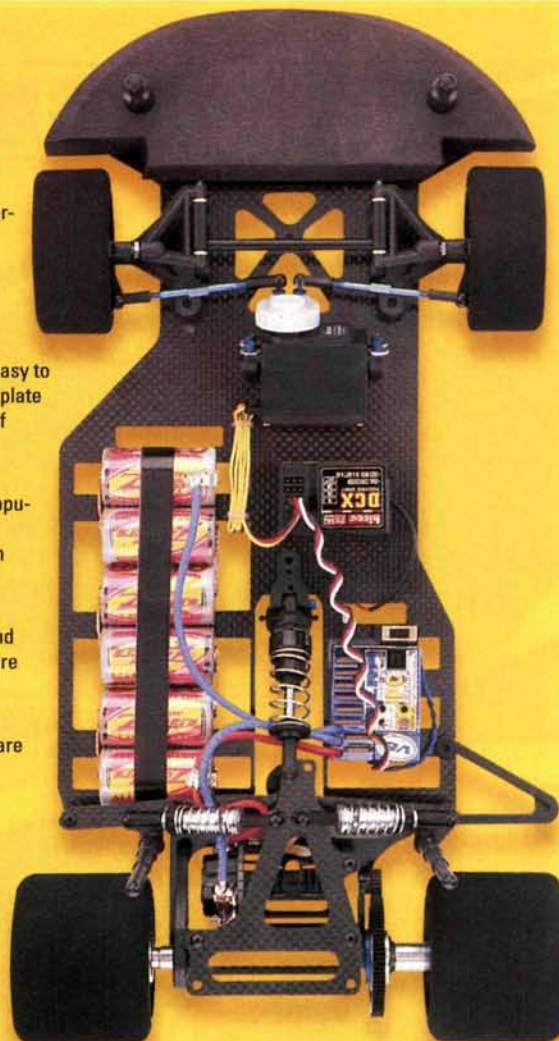
- Smooth, easy-to-assemble dampers.
- Class-leading fit and finish.
- Included foam bumper.

## WHAT'S NOT

- Stone Age spur gear.
- Diff is not pinned.

## QUICK SPECS

- CHASSIS WEIGHT: 11.06 oz.
- WHEELBASE: 10.44/10.11 in.
- FRONT/REAR width: 5.95/5 in.
- LIST PRICE: \$285



## CHASSIS

The Phaze 1's chassis is dominated by the substantial battery brace that's bolted to it with three aluminum standoffs. In addition to eliminating the need for battery tape and making it virtually impossible to eject the battery, the brace lends extra stiffness to the chassis. Seven battery slots are provided, but the rear-most slot is not as wide as the others; to run the battery fully inboard, you must use the six forward slots. The front-end screw holes have not been perfectly countersunk; the screw heads protrude about 0.020 inch.

## REAR SUSPENSION

A mono-ball/single-trailing-link design keeps the pod lined up, and three Delta-type shocks provide the damping. The rear pod uses the old-style Associated 10L motor plate and plastic left pod plate; these are unusual choices for a modern-day car, but they are functional.

## FRONT SUSPENSION

Associated's Dynamic Strut with trailing axles is used here; a brace tube is not included. PSE-threaded stub axles replace the E-clip-style stock pieces, and Wolfe Motorsports' progressive springs with itty-bitty spring perches are included. The stock Associated steel turnbuckles have been retained but must be cut before they can be installed.

## AXLE

Great stuff here. An Irrgang Racing Service (IRS) fiberglass axle, jewel-like diff hub and double-clamping left hub are included. The hubs have been drilled for pinning, and pin material is supplied, but the included diff rings are not notched—bummer. A PSE Rocket Sprocket spur gear is also provided.

## OTHER STUFF

The Phaze 1 is the only kit that supplies a body; there's a slippery PSE Pontiac Grand Prix in the box. PSE also supplies its Velocity rims shod with blue tires.

## PARMA/PSE PHAZE 1

## QUICK SPECS

- CHASSIS WEIGHT: 10.59 oz.
- WHEELBASE: 10.41 in.
- FRONT/REAR width: 5.94/4.8 in.
- LIST PRICE: \$425

## WHAT'S HOT

- Intelligent spec; Wolfe springs, IRS axle, PSE stub axles, Rocket Sprocket spur gear.
- Body included.

## WHAT'S NOT

- Some screw heads do not fit flush with chassis bottom.
- Diff rings are not notched.
- Tie rods are too long.





## CHASSIS

Extra-wide battery slots dominate the plain-weave G-Force chassis with little material remaining on the right side of the car's centerline. As such, there isn't much in the way of lightening holes; you can't lighten what isn't there! The holes for the front end are slotted to permit wheelbase adjustment.

## REAR SUSPENSION

This is a T-plate car with a unique tweak system built around the rear pivot ball. A rocker plate is attached to the top of the rear T-plate pivot to activate springs mounted on the rear chassis brace; this takes T-plate flexing out of the tweak equation. Ironically, the included Dillon relieved T-plate features a large opening to allow greater torsional flexing; Dillon offers a variety of plates with various cutouts to tune cars that accept 10L-style T-plates with conventional tweak screws. In the case of the Racetech car, the Dillon plate is used more as a traction-tuning aid; a wider slot yields more rear bite. A single plastic damper tube handles roll forces, and an "old-style," Associated hard-anodized damper takes care of fore and aft movement (latest kits now include a VCS unit).

## FRONT SUSPENSION

Associated Dynamic Strut. As on many other cars, the cross-brace for the front end has been omitted on the G-Force. However, to bolster rigidity, each lower arm is secured by three screws instead of two. In-line axles, Lunsford titanium turnbuckles and a Kimbrough servo-saver are supplied.

## AXLE

Racetech specs an IRS axle and hub set as well as a Kimbrough spur gear and notched diff rings.

## OTHER STUFF

The aluminum motor- and left-side pod bulkheads are thick hunks of aluminum, and the center shock/antenna mount is also a nicely machined piece. A substantial graphite bumper is included, as are Bolink threaded body posts. The G-Force pictured here is the superspeedway car; a short-track version with a wider front track (+0.30 inch) is also available. For velodrome specialists, Racetech offers a long-wheelbase car (+0.50 inch) with narrower battery slots.

## QUICK SPECS

- CHASSIS WEIGHT: 11.2 oz.
- WHEELBASE: 10.31-10.41 in.
- FRONT/REAR width: 5.9/5.9 in.
- LIST PRICE: \$249

## RACETECH G-FORCE

## WHAT'S HOT

- High quality throughout.
- Includes pro-quality IRS axle and hubs—complete with notched diff rings!
- Clever tweak system.

## WHAT'S NOT

- Tires are not included.
- Single plastic damper is a bit flimsy.

## SAVAGE MOTORSPORTS HEADHUNTER

## CHASSIS

Savage wins the award for the beefiest chassis plate; at 0.118 inch, the matte-black graphite slab is the thickest of all those included in this guide. Numerous well-placed cutouts and the skip-slot battery openings help keep weight down. The battery is angled slightly: the front of the pack is closer to the chassis centerline.

## REAR SUSPENSION

A mono-ball/drag-link setup allows the pod to articulate, and three, large, Delta-type shocks control fore/aft and roll damping. The motor pod uses identical left and right aluminum motor plates to hold the rear axle; this makes it simple to convert the car to left-side drive.

## FRONT SUSPENSION

Associated's Dynamic Strut unit and steel turnbuckle tie rods are supplied (the tie rods must be cut before installation). To adjust ride height, washers are used instead of the usual plastic standoff blocks. The tubular front-end brace usually used with the Dynamic Strut has also been omitted.

## AXLE

An IRS axle and hubs and a Kimbrough spur gear with notched diff rings are included.

## OTHER STUFF

A heavy-duty graphite front bumper is in the box, and nice touches abound; the drag link is a Lunsford titanium unit, and the center shock/antenna mount is a brightly polished bit of sculpted aluminum. Pro-Line tires—green rears, blue fronts—and a Kimbrough servo-saver complete the kit.

## WHAT'S HOT

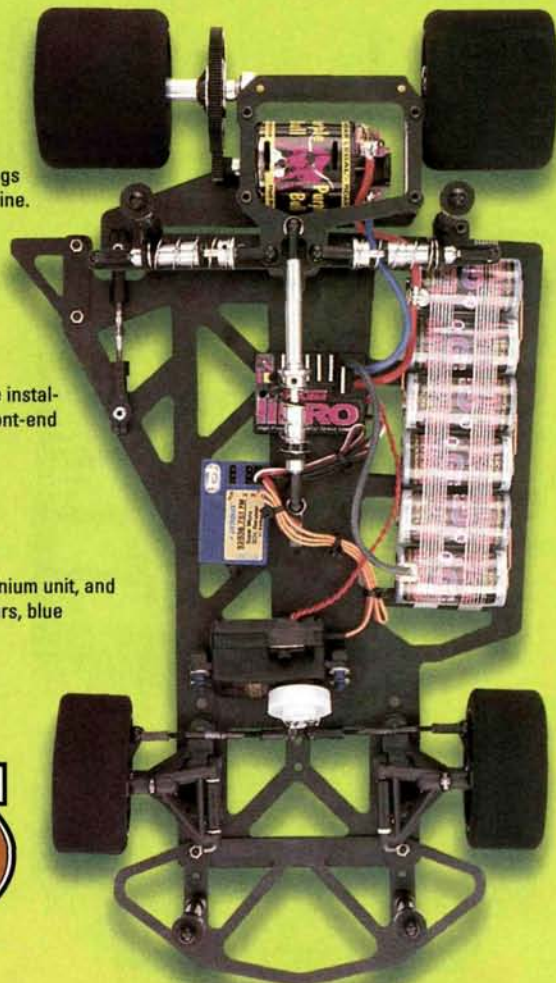
- Left-side-drive adaptable.
- Includes pro-quality IRS axle and hubs.
- Stout chassis plate.

## WHAT'S NOT

- Front end is not braced.
- Included tie rods are too long.

## QUICK SPECS

- CHASSIS WEIGHT: 11.5 oz.
- WHEELBASE: 10.58 in.
- FRONT/REAR width: 5.85/4.82 in.
- LIST PRICE: \$250





# SPEEDMERCHANT WFO PRO

center damper, thereby cleverly exploiting the extra chassis space afforded by the mono-ball rear end. The rest of the chassis is sensibly designed for minimal weight and acceptable stiffness. Its front is drilled to allow two fore/aft positions and two inboard/outboard positions for the suspension. In addition to the "full wide" and "full narrow" positions, the front end may be offset in relation to the chassis by mounting one arm inboard and the other outboard. One caveat, though: the Swiss-cheese chassis leaves little material between the front-end holes, so watch out for those board hits.

## REAR SUSPENSION

Mono-ball/trailing link. A pair of plastic damper tubes keeps roll forces in check, and a large-volume, threaded aluminum damper handles the bumps. Speedmerchant's "Speed-Tune" design incorporates small coil springs to tweak the rear end. The design is similar to the Racetech setup, but the springs are much farther outboard, and this allows softer springs to be used for the same effect. The rear pod features Speedmerchant's Gear Up extended motor plate for greater gearing flexibility, and a double-thick lower pod plate further beefs up the rear end.

## FRONT SUSPENSION

This is another Dynamic Strut car, but Speedmerchant has equipped it with aluminum lower front arms for greater strength (and they're dang cool lookin', too). In addition, shims may be installed behind the lower kingpin sockets (they are separate pieces) to alter track. Associated Factory Team turnbuckles are included.

## AXLE

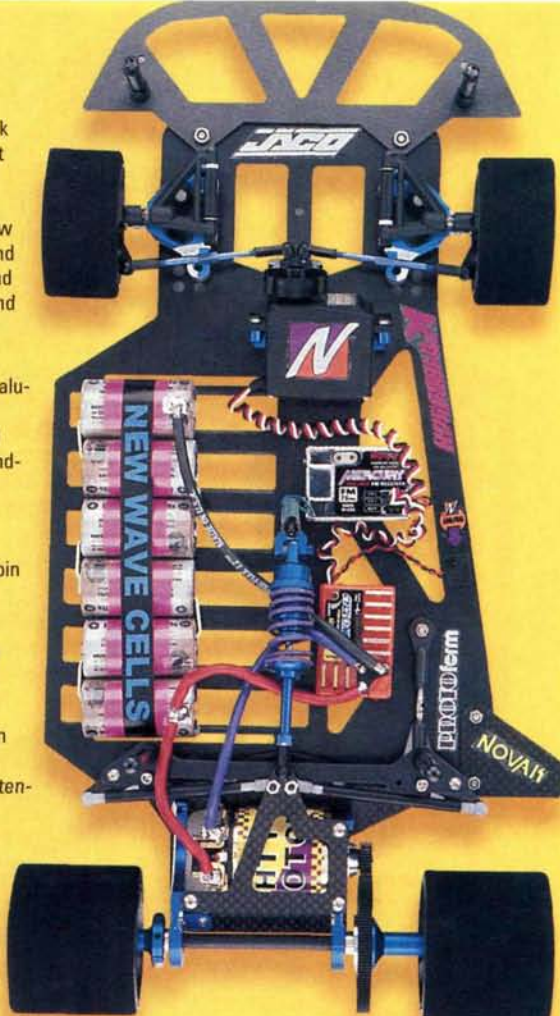
Nothing unusual here; just high-quality stuff. The blue hubs are cut away between the mounting screws, and the left-side unit features a single clamp design. A solid thrust cone is used in the diff instead of Belleville washers.

## OTHER STUFF

Some of you might roll your eyes, but looks matter to this car guy, and the WFO PRO is a pretty car. In addition to the blue hubs and machined suspension arms, Speedmerchant supplies trick little pieces such as blue-anodized dress standoffs for the rear brace, threaded, aluminum servo mounts and a machined aluminum antenna/shock mount. A rigid graphite bumper completes the car.

## CHASSIS

If you're into wide battery slots, check out the WFO PRO. The three rearmost slots extend all the way beneath the



## WHAT'S HOT

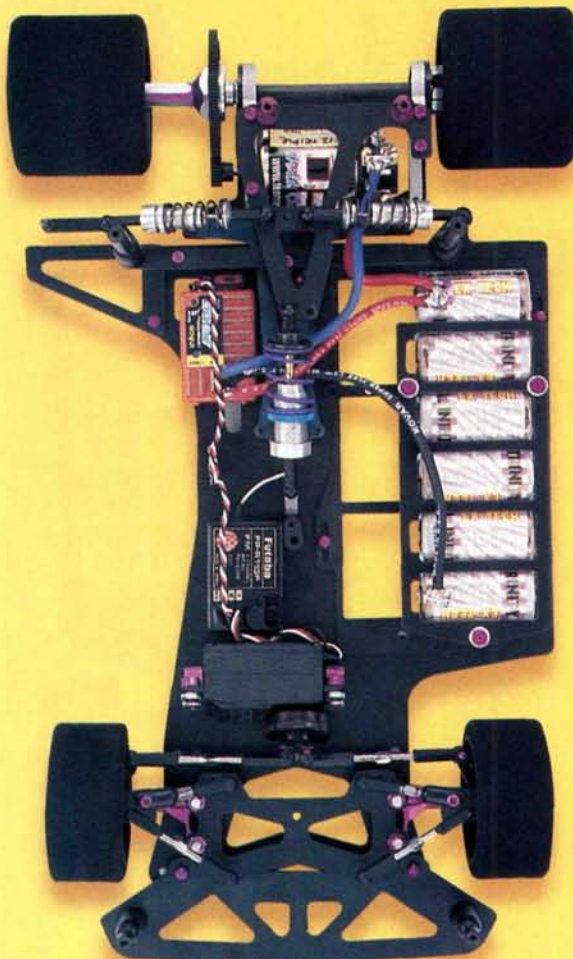
- Innovative, highly adjustable design.
- Excellent spec with lots of trick parts.

## WHAT'S NOT

- Swiss-cheese front end could be a structural weak spot; hacks beware.

## QUICK SPECS

- CHASSIS WEIGHT: 12.08 oz.
- WHEELBASE: 10.54 in.
- FRONT/REAR width: 5.9/6.5 in.
- LIST PRICE: Not cheap



*This car came straight to us from the Snowbird Nats, courtesy of Joel Johnson, so you might see some changes when the production version rolls out. Here's the scoop for now ...*

# TRC DISRUPTER 2 PROTOTYPE

## CHASSIS

The matte-finish graphite chassis features a unique battery tray in lieu of the usual slot arrangement. Three screws secure the completely independent battery tray/upper brace assembly on the chassis. The tray's mounting holes are slotted, and this permits fine fore/aft adjustment of the pack. Three mounting holes for the upper brace permit the cells to be mounted full inboard, full outboard, or in a middle position—t-rick. Just enough material remains to the right of the chassis's centerline to allow comfortable mounting space for the electronics.

## REAR SUSPENSION

Like the SwitchBlade, the Disrupter 2 is equipped with a spring-steel T-plate. Notably, Joel fitted tweak screws to the T-plate despite being able to adjust tweak via the lateral shocks. TRC has not yet decided which type of dampers will be supplied; it's hoped that large-volume units like the ones shown here will be spec'd. Rear pod offset is highly adjustable; four positions are available.

## FRONT SUSPENSION

Sorry, the aluminum lower arms seen here will not be production parts. The dual-turnbuckle upper arms will be included, along with one-piece molded units as a more user-friendly option. In-line axles are supplied.

## AXLE

The production hubs will not have the cutaway silver area shown here; they will be purple. The left hub is a double-clamper, and the axle is solid graphite.

## OTHER STUFF

Angled servo mounts in purple aluminum will be stock equipment as will purple wing mounts. A graphite front bumper and threaded plastic body mounts are in the box.

## QUICK SPECS

- CHASSIS WEIGHT: NA
- WHEELBASE: 9.75/10.5 in.
- FRONT/REAR width: 5.87-6.18/5.18-5.56 in.
- LIST PRICE: Not yet determined

## WHAT'S HOT

- Highly adjustable battery tray.
- Spring-steel T-plate.

## WHAT'S NOT

- Some of the trick parts Joel used won't be on the car (but that will keep the car's cost down).

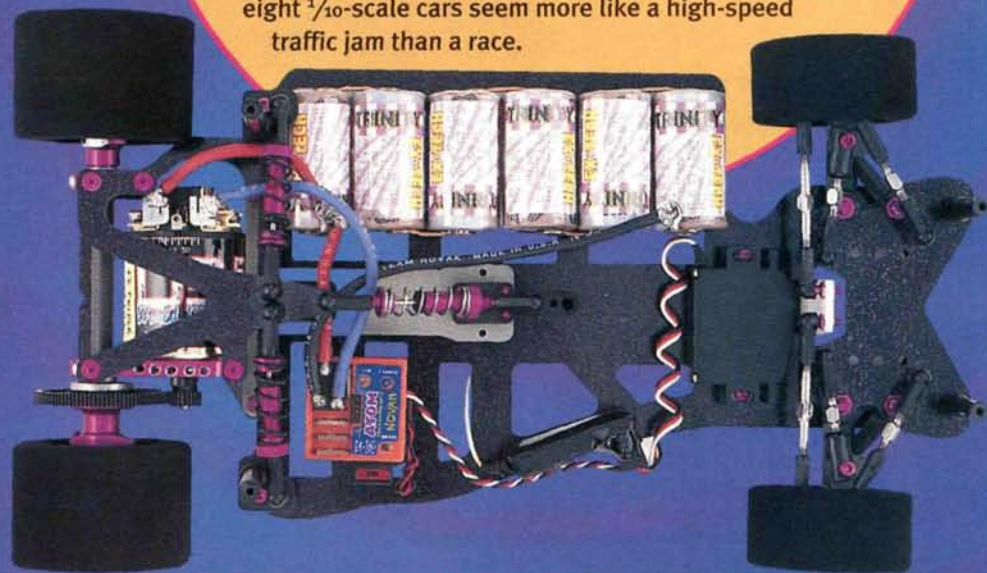


# LITTLE LEFTIES

# 1/12 scale

**O**val racing is for 1/10-scale cars; 1/12-scale cars are for on-road stuff—right? Well, mostly, but 1/12 oval racing is shaping up into a pretty cool class. So far, big-name players Associated and Trinity have launched cars, and a lot of the smaller guys say they have cars in the works. The Kirby Hand Edition car shown here is about as “signature” as you can get; it’s Kirby’s personal car! The RC12L30 is a production piece. Check ‘em out.

It’s interesting to note that both cars are configured as 6-cell machines, although most tracks will probably stick with 4-cell racing as mandated by ROAR. Also notable is the wheelbase of the cars compared to their track; these things are limos! Although not limited to small tracks, 1/12 oval cars will undoubtedly become popular on those tight “bull ring” tracks where eight 1/10-scale cars seem more like a high-speed traffic jam than a race.

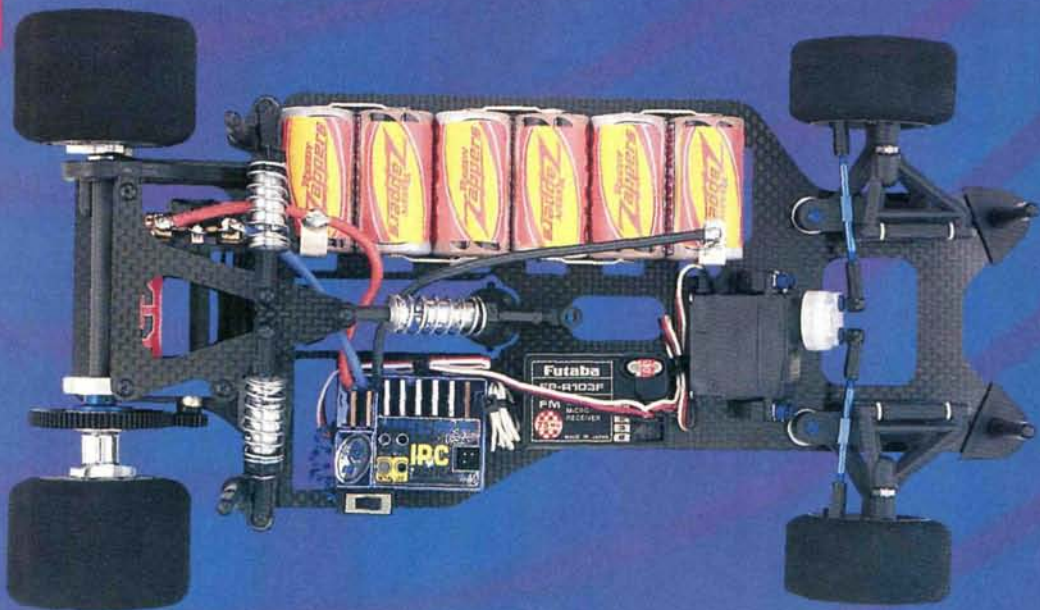


## TRINITY KIRBY HAND EDITION SWITCHBLADE 12SS

Trinity ups the glam factor with a purple glitter finish, but rest assured, the Kirby car’s graphite is as serious as the techy-lookin’ stuff. The 6x3 battery slots allow plenty of pack-placement flexibility, and you could even go 3x3 for on-road work. T-bars still reign supreme among 1/12 designs, and the SB12SS is no exception. However, tweak screws have been eliminated in favor of lateral shocks that provide more consistent damping and allow fine preload adjustments. The minimalist rear pod keeps weight low, but Kirby and Ryan (Kirby’s esteemed brother and ace wrench spinner) got drill-happy anyway. Also note the shrink-wrapped receiver—a common weight- and space-saving trick among the front-runners. Kirby ran the multi-link Reactive Caster front end, but the simpler, molded-upper-arm version will probably be included with production kits.

## ASSOCIATED RC12L30

Oops; looks as if someone left an RC10L30 in the dryer too long! Associated’s 1/12 ring-runner is virtually a clone of its “big brother,” and that should make it a durable, reliable performer. The trademark plain-weave graphite chassis has the same 6x3 battery-slot configuration as the 10L30 and uses a scaled-down fiberglass T-bar and triple VCS shocks to control pod movement. All three VCS dampers are aluminum micro-jobbers—no room for the big composite center unit found on the 1/10 car. Naturally, there’s a Dynamic Strut up front, and a cute little “bra” protects the chassis plate. Jaco tires and other third-generation goodies, such as a graphite through-axle and three-bolt hubs, are stock.





# TRINITY SWITCHBLADE 10SS

(T-BAR VERSION)

## CHASSIS

The seven-slot Trinity car features a sensible chassis design with ample space for electronics. Two sets of holes are provided for the Reactive Caster front end, and predrilled servo-mounting holes are a welcome touch. Matte-finish graphite is used throughout.

## REAR SUSPENSION

Initially conceived as a mono-ball car, the latest SwitchBlade favors a fiberglass T-plate. A single plastic damper tube controls roll. A smallish, Delta-style oil shock takes care of fore/aft suspension movement and features a threaded body for easy preload adjustment. An additional pair of holes in the rear pod permits offset to be adjusted.

## FRONT SUSPENSION

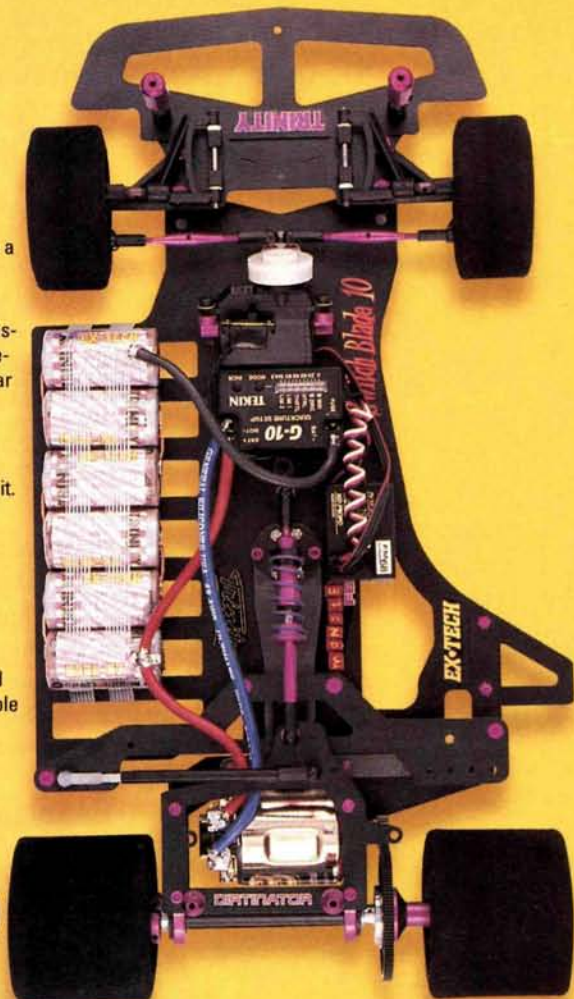
Trinity's second-generation Reactive Caster front end is in the box; it uses one-piece upper arms for simplified assembly. Caster is easily adjusted via shims—much like the Associated Dynamic Strut unit. The kit setup uses fixed caster and trailing axles. Aluminum turnbuckles handle toe adjustment.

## AXLE

The solid graphite axle does not have a pinned diff flange, although the diff hub is pinned and mates with a notched ring. The left hub is a setscrew design, and both hubs are purple-anodized. A Trinity Zero-Gravity spur gear is included.

## OTHER STUFF

Lots of aluminum parts are included, such as the hardware, pod bulkheads, angled servo mounts and the shock. The T-bar car will accept "standard" (RC10LSS drilling) T-bars. The SB10SS is also available with a mono-ball rear end and triple shocks.



## WHAT'S HOT

- Nice spec; includes aluminum servo mounts, lots of anodized parts.
- Well-braced front suspension.

## WHAT'S NOT

- Single plastic damper tube doesn't seem like enough damping.

## QUICK SPECS

- CHASSIS WEIGHT: 11.08 oz.
- WHEELBASE: 10.1/10.51 in.
- FRONT/REAR width: 5.88/4.93 in.
- LIST PRICE: \$155

## CHASSIS

The X-15's thick graphite chassis plate features six, extra-wide battery slots. Additional mounting holes permit the front-suspension assemblies to be moved forward and backward for wheelbase adjustments, and the right side also has an extra set of holes to allow front-track width adjustments. A mounting hole is provided for a center body-post mount.

## REAR SUSPENSION

The X-car is the only machine that uses a graphite T-bar. Ordinarily, this would be much too stiff to allow adequate rear suspension, but the Wood design doesn't rely on flex for up-and-down pod action; instead, three pivot balls are captured along the pod/T-bar junction. This setup allows the free movement of a mono-ball rig while it maintains the straight tracking and consistent feel of a T-bar. An oversize Delta shock "springs" the car, and smaller Deltas control roll. Both left and right pod bulkheads are slotted for a motor, and optional pod plates can be used with a matching set of hubs to offset the pod 0.250 inch.

## FRONT SUSPENSION

Extra-long, 1/8 inch in-line axles are used in the Dynamic Strut front end to allow additional front track tunability. The A-team's low-rent (but functional) steel turnbuckles are included, but Wood has added some spicier bits as well. You've no doubt already noticed the polished aluminum suspension brace; the Wood unit is really sweet because its width is adjustable. Also nice: high-quality, large-diameter-coil front suspension springs, complete with upper and lower centering perches, and Wood's Pro-Long kingpin set.

## AXLE

Wood specs the same solid graphite axle used by Associated, and includes brightly polished T6 aluminum hubs—tough stuff. A Kimbrough Pro-Thin spur gear is included with the kit.

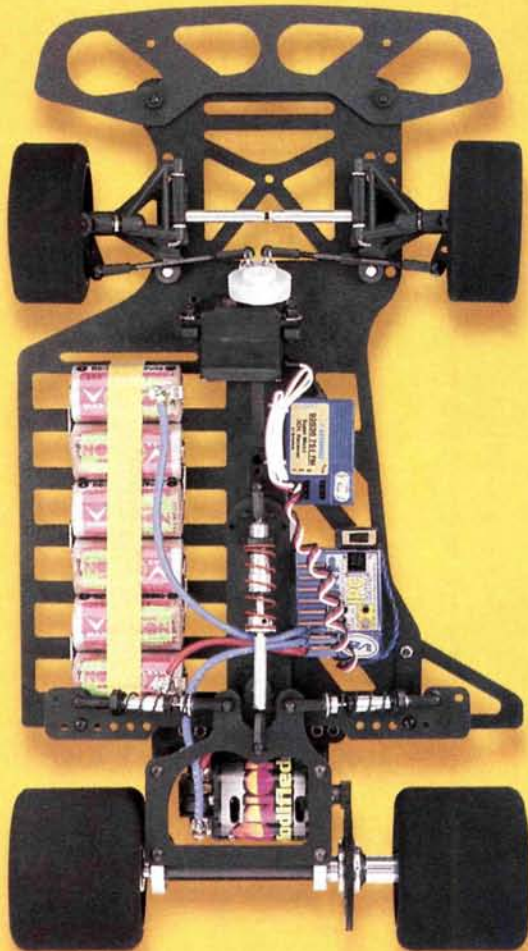
## OTHER STUFF

A Kydex front bumper, wider than most, protects the front end. An additional set of springs is included for the front end as well as for the rear shocks. There's nothing really fancy about the X-15; it's just a very well-designed car. And that's the best feature you could ask for.

## QUICK SPECS

- CHASSIS WEIGHT: 11.62 oz.
- WHEELBASE: 10.1/10.46 in.
- FRONT/REAR width: 6.12/ 6.4 in./ 4.87 in.
- LIST PRICE: \$250

## WOOD RACING X-15



## WHAT'S HOT

- Insightful, no-nonsense design.
- Incorporates best of T-bar and mono-ball designs.
- Trick front-end brace.
- Wolfe tuning springs included.

## WHAT'S NOT

- Little material is left between the right-side, front-end mounting holes—could be a structural weak point.



## MONO-BALL OR T-PLATE: WHAT'S THE DIFFERENCE?

**T**o a large extent, the performance of an oval car is determined by the effectiveness of its rear suspension, which must control both bump forces and roll forces—not an easy task for a trailing straight-axle design that must suspend the motor along with the rear wheels. Although individual design details differ, there are essentially two ways to suspend the motor pod:

■ **T-PLATE.** The “classic” design is the T-plate (or T-bar), which uses two mounting screws to align the plate on the chassis and relies on the “flexiness” of its material (fiberglass or spring steel) to act as suspension—usually with a coil-over shock for damping and additional suspension.

**PRO:** easier to drive. T-bar cars generally produce more traction from a given setup than mono-ball cars, and the fixed alignment of the rear pod helps ensure the car will track straight. Many find T-bar cars easier to tune and more forgiving to drive.

**CON:** Traditional T-bar cars with tweak screws are less tunable because the tuner must always work around the T-bar's spring action. For example, you might wish to use a thin, flexible T-bar to allow the rear end to cope better with bumps; but if the track requires a stiff T-bar to combat roll forces, the “flexy” T-bar that helps on bumps will hurt in the



corners. Fiberglass T-bars can also be inconsistent because of the changing flex characteristics of the fiberglass T-bar as the fibers of the material break down with each flex cycle.

■ **MONO-BALL.** This setup uses a single, large pivot ball for pod articulation. Since the mono-ball allows the pod to flop around in all directions, one or two drag links are used to keep the pod and rear axle perpendicular to the chassis' centerline. The system has no built-in shock-absorbing ability, so a coil-over shock is always used to absorb and damp fore-to-aft pod movement. Side-to-side damping is handled by a pair of lateral shocks or one or two damper tubes.

**PRO:** mono-ball cars have no inherent spring action and can be set as soft or as firm as necessary in one axis without affecting the other axis of movement; for example, a mono-ball car can be set with lots of roll damping for hard cornering, while fore-and-aft damping may be kept soft to cope with bumps. Likewise, spring rates are completely independent. If your track requires a highly “active” rear suspension, mono-ball is the way to go.

**CON:** mono-ball cars generally don't develop as much traction on smooth tracks as T-bar cars (you can “bright side” that by saying mono-ball cars have more steering). In addition, mono-ball machines can be more difficult for the less experienced tuner to set up; it's not hard for inexperienced racers to tune themselves into the boards.



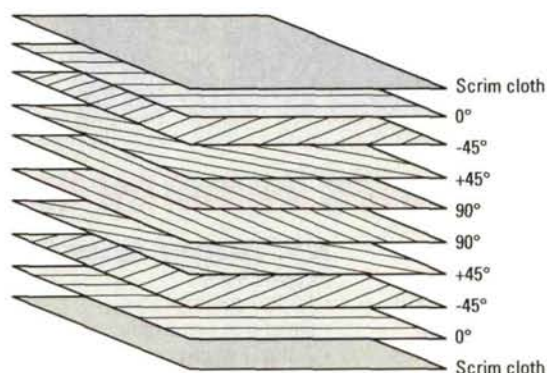
## MATERIAL ISSUE

**T**he difference between the two types of chassis materials for competition pan cars is apparent at a glance. Although both are referred to as “graphite,” one type appears to be woven of independent fibers in a crisscross pattern, while the other material has a solid, matte finish. Viewed from the side, both types show layered, laminated construction. So what's the difference? Believe it or not, the only real difference is cosmetic.

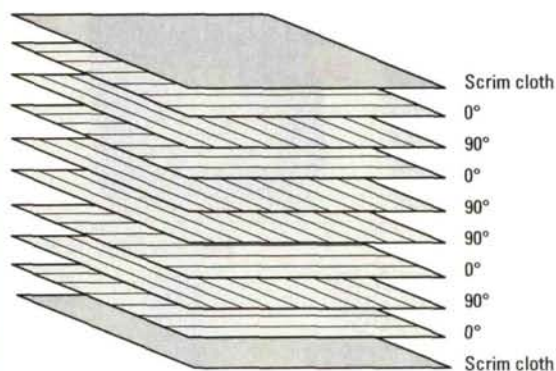
Both types of graphite are constructed of individual sheets of non-woven, unidirectional graphite fibers. The outer layer determines the material's appearance. The matte black graphite gets its look from the very thin, lightweight sheet of fiberglass “scrim cloth” applied to its outer surfaces. Woven or “plain-weave” graphite uses the familiar checkerboard-pattern material for the outermost layer. Assuming samples of a matte finish and a plain-weave finish are of the same grade, they will be internally identical and functionally the same.

Now, I mentioned grade, and it's an important factor. There are two grades: standard and component. Standard grade is torsionally stiffer (that is, more resistant to twisting) and places the graphite fibers in four directions: 0 degree, plus 45 degrees, minus 45 degrees and 90 degrees (see illustration). Component-grade graphite places the fibers in two directions: 0 degree and 90 degrees. The material is less expensive but more torsionally flexible than an equally thick piece of standard-grade graphite. Component-grade graphite is often used for small parts where torsional forces are not a factor and in applications where the chassis does not rely on the strength of a single graphite sheet for stiffness. For example, double-deck chassis get much of their strength from the stand-offs that join the plates and generally do not require standard-grade graphite construction.

Some racers say woven-look graphite has a greater tendency to delaminate because of crash abuse, but both materials can be damaged in this way. No matter which type of graphite your car is made of, it is a good idea to seal the edges with CA to prevent the layers from delaminating due to crash impacts. Better still, run a foam bumper!



**STANDARD GRADE**



**COMPONENT GRADE**



## CHASSIS SPECIFICATIONS

	ASSOCIATED RC10L30	PARMA/PSE PHAZE 1	RACETECH G-FORCE	SAVAGE MOTORSPORTS HEADHUNTER	SPEED MERCHANT WFO PRO	TRC DISRUPTER 2 PROTOTYPE	TRINITY SWITCHBLADE 10SS	WOOD RACING X-15
FRONT END TYPE	ADS*	ADS	ADS	ADS	ADS	Trinity	Trinity	ADS
FRONT END BRACE INCLUDED	•	—	—	—	—	•	•	•
KINGPIN SPRING WIRE DIAMETER (L/R)	0.19 in.	0.029 in.	0.023 in.	0.022 in.	0.027 in.	0.022 in.	0.029 in.	0.024/0.025 in.
IN-LINE/TRAILING FRONT AXLE	In-line	Trailing	In-line	Trailing	Trailing	In-line	Trailing	In-line
GRAPHITE GRADE	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard
GRAPHITE THICKNESS	0.10 in.	0.114 in.	0.10 in.	0.118 in.	0.111 in.	0.10 in.	0.10 in.	0.11 in.
REAR SUSPENSION TYPE	T-bar	Mono-ball	T-bar	Mono-ball	Mono-ball	T-bar	T-bar	T-bar
ROLL DAMPING	Alum. VCS** shock	Delta shocks	Damper tube	Delta shocks	Damper tubes	Damper tube	Damper tube	Delta shocks
LATERAL SPRING WIRE DIAMETER	0.040 in.	0.040 in.	NA	0.039 in.	NA	0.035 in.	NA	0.038 in.
BUMP DAMPING	VCS shock	Delta shock	VCS shock	Delta shock	Aluminum shock	Delta shock	Delta shock	Delta shock
MAIN SPRING WIRE DIAMETER	0.040 in.	0.046 in.	0.047 in.	0.039 in.	0.072 in.	0.040 in.	0.053 in.	0.043 in.
LEFT POD BULKHEAD	Plastic	Plastic	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum
SERVO-SAVER INCLUDED	•	•	•	•	•	•	•	•
TURNBUCKLE TIE RODS	Steel	Steel	Titanium	Steel	Titanium	Titanium	Aluminum	Steel
WHEELBASE	10.44/10.11 in.	10.31-10.41 in.	10.41 in.	10.58 in.	10.54 in.	9.75/10.5 in.	10.1/10.51 in.	10.1/10.46 in.
FRONT WIDTH	5.95 in.	5.94 in.	5.9 in.	5.85 in.	5.9/6.5 in.	5.87/6.18 in.	5.88 in.	6.12/6.4 in.
REAR WIDTH	5 in.	4.8 in.	5.9 in.	4.82 in.	4.88 in.	5.18/5.56 in.	4.93 in.	4.87 in.
CHASSIS WEIGHT	11.06 oz.	10.59 oz.	11.2 oz.	11.5 oz.	12.08 oz.	NA	11.08 oz.	11.62 oz.
BATTERY SLOTS (L/R)	6/3	7/0	6/0	6/0	6/0	6/0	7/0	6/0
SLOT WIDTH	2.64 in.	1.7/2.3 in.	2.88 in.	2.29 in.	3.2/3.76 in.	3.030 in.	2.24 in.	3.11 in.
FACTORY-DRILLED SERVO HOLES	•	—	—	—	—	NA	•	—
ADJUSTABLE POD OFFSET	0.25 in.	—	0.25 in.	—	—	0.30 in.	0.30 in.	—
SPUR GEAR	Associated 48p/81T	PSE 120T	Kimbrough 120T	Kimbrough 120T	Kimbrough 120T	Trinity Zero G 120T	Trinity Zero G 120T	Profiled Kimbrough 120T
PIN-READY DIFF	—	•	•	•	•	•	•	•
AXLE TYPE	Graphite	IRS fiberglass	IRS fiberglass	IRS fiberglass	Graphite	Graphite	Graphite	Graphite
LEFT HUB TYPE	Single clamp	Double clamp	Double clamp	Double clamp	Double clamp	Double clamp	Setscrew	Single clamp
WING MOUNTS	—	—	•	—	—	—	•	—
TIRES	Jaco green	PSE blue	—	Pro-Line green/blue	—	TRC blue	TRC blue	—
BUMPER	Foam/plastic	—	Graphite	Graphite	Graphite	Graphite	Graphite	Kydex
LIST PRICE	\$285	\$425	\$399.95	\$399.95	NA	NA	\$285	\$399.95
AVAILABLE AT (Prices vary with location)	\$170	\$280	\$249	\$250	NA	NA	\$155	\$249.98

\* Associated Dynamic Strut

\*\* Volume Compensating System

About the specs: spring wire diameters include painted or plated finish. Wheelbase measurements reflect shortest and longest possible settings with included steering blocks and rear bearing carriers. Front width(s) measured from innermost front bearing surfaces. Rear width measured from hub faces with kit-suggested axle spacing. All weights are for bare chassis with servo mounts and body posts (no wheels, electronics or body). Cars with battery slots of varying widths have measurements listed for narrowest and widest slots. Pod offset measured as distance from center position. All specifications subject to change without notice.

## WHO RULES?

Oval pundits will argue that the XYZ car is only good for super-speedway, while the ABC machine is the short-tracker of the bunch. While that may be true to a small extent, all of the cars featured here can work well on any oval, as long as you're willing to log the track time to sort out your personal rig. However, some of these cars are better for certain types of people if not certain types of tracks. The Associated RC10L30 is arguably the easiest to build; the Speedmerchant WFO PRO is the most adjustable; the

Parma/PSE Phaze 1 is the lightest; what's important to you? Many of the cars here will be going straight into "Thrash Test" rotation (and we'll also be testing the new CRC car, which wasn't ready in time for this Guide) so you'll have some input from hardcore oval racers to help you pick a personal best, and you should also consider the machines that are turning the fast laps at your local track. Just remember to have fun—and tell 'em *Radio Control Car Action* sent you.

\*The addresses of the companies featured in this Guide are listed in the Index of Manufacturers on page 209.









# DUAL-PURPOSE DYNAMITE







# YOKOMO **MR-4 Rally**

by Peter Vieira

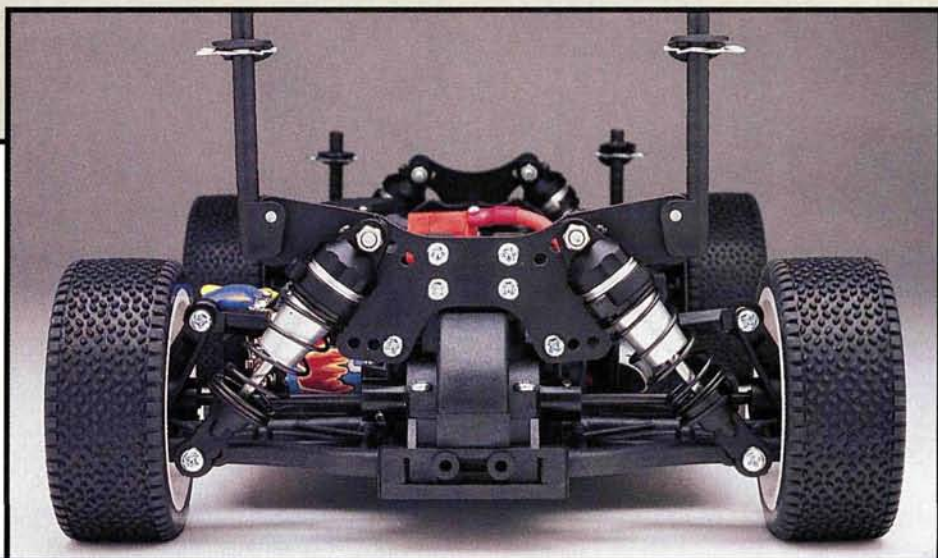
**YOKOMO\* DOESN'T FOOL AROUND**; when the well-known Japanese car maker sets out to build a new vehicle, it's all or nothing. Given that fact, Yokomo's decision to build a dedicated rally racer is a solid indication that the class is here to stay. The new MR-4 is not a warmed-over "YR" sedan; it's an entirely new launch for the Yoke crew. With its molded chassis (a first for Yokomo) and many new parts, the car is an exciting departure that appears to be capable of real rally performance. Let's take a closer look.



# 1<sup>ST</sup> LOOK

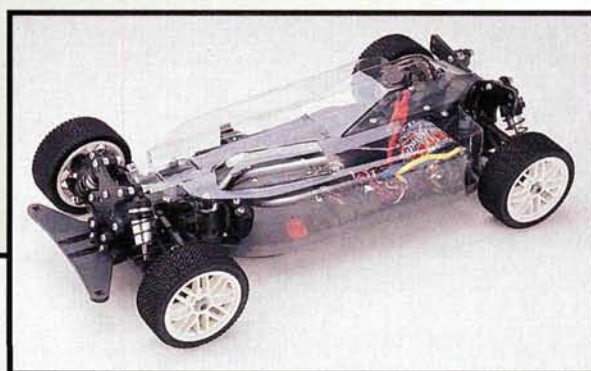
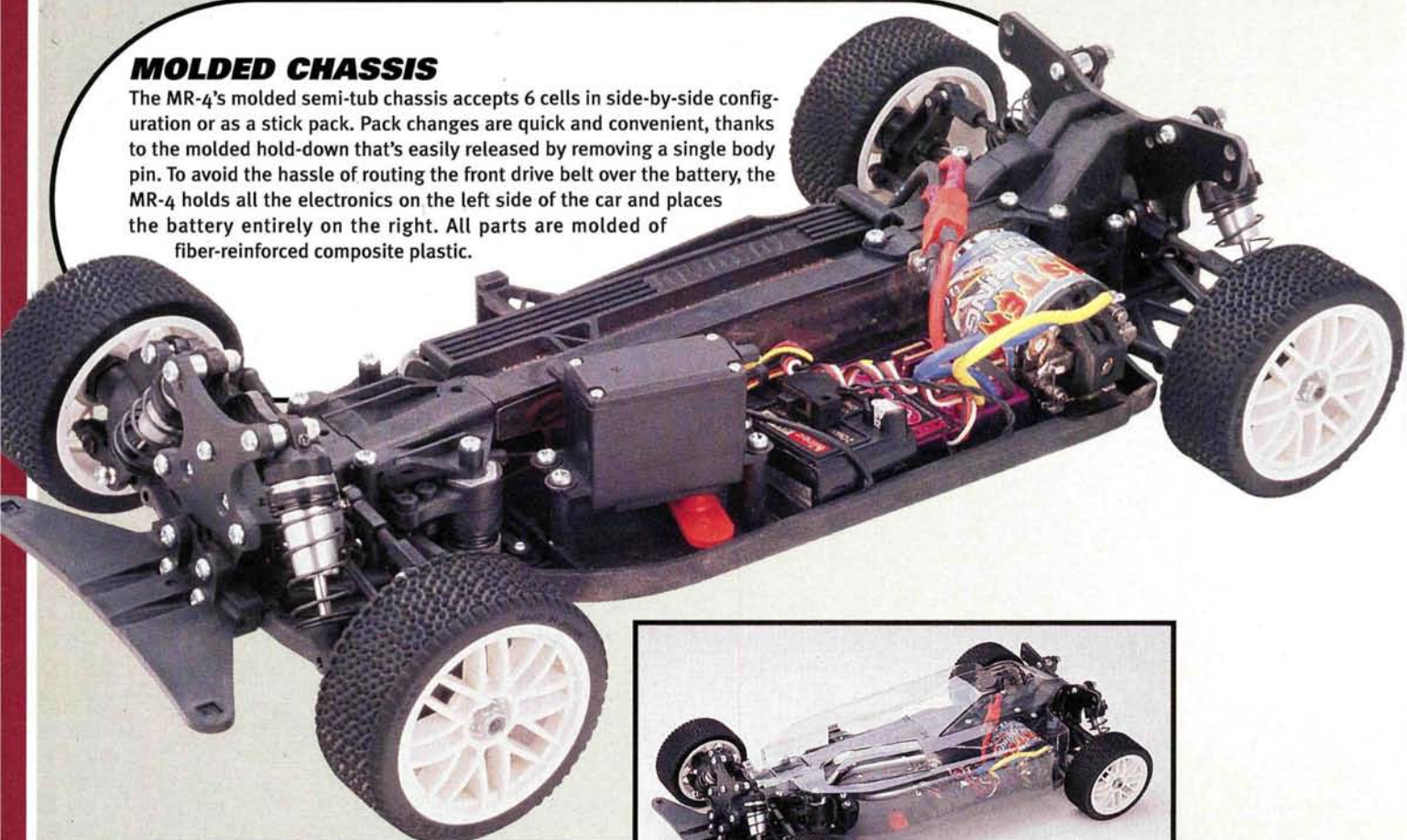
## COMPOSITE SHOCKS

This final-version prototype MR-4 sports alloy dampers but the production car will use composite shocks with a built-in volume compensator; the Yoke dampers will use foam sleeves to do the job, much like Associated's VCS shocks and Schumacher's Vari-shocks. Both front and rear shock towers are made of thick fiberglass.



## MOLDED CHASSIS

The MR-4's molded semi-tub chassis accepts 6 cells in side-by-side configuration or as a stick pack. Pack changes are quick and convenient, thanks to the molded hold-down that's easily released by removing a single body pin. To avoid the hassle of routing the front drive belt over the battery, the MR-4 holds all the electronics on the left side of the car and places the battery entirely on the right. All parts are molded of fiber-reinforced composite plastic.



## SEALED DRIVE TRAIN

No, that's not a built-in ant farm; the MR-4 uses a clear Lexan shield to seal the pathway for the front belt, which is enclosed by the molded, separately attached "backbone." A chassis cover is also provided but is not designed to act as a scale interior. It does, however, look suspiciously buggy-like!







## DUAL BELTS AND BALL DIFFS

The rear belt is hidden within the rear bulkhead, and ball diffs are used at both ends of the car. The diffs spin on ball bearings, but the rest of the car is equipped with bronze bushings. A slipper clutch is not provided, and dogbone axles are used on all four corners; springs are used in the diff out-drives to keep the dogbones from chattering.



## MICRO-BLOCK TIRES

Yokomo specs its own tires and molded foam inserts for the MR-4. The tires have an unusually flat, low-profile carcass for an off-road design but should hook up well on hard, smooth tracks—just the sort of terrain favored by the micro-block tread pattern.

## SPECIFICATIONS

SCALE 1/10  
LIST PRICE \$238

### DIMENSIONS

Wheelbase 10.1 in. (257mm)  
Width 7.4 in. (188mm)

### WEIGHT

Gross, RTR 58 oz. (1,644g)

### CHASSIS

Type Molded semi-tub  
Material Fiber-reinforced composite

### DRIVE TRAIN

Type Dual belt  
Primary Pinion/spur  
Drive shafts Dogbones  
Differential(s) Ball  
Clutch None  
Bearings/bushings Bearing-supported diffs and bronze bushings

### SUSPENSION (F/R)

Type Lower A-arm w/adj. upper link  
Damping Aluminum oil-filled coil-over shocks

### WHEELS

Type One-piece plastic  
Dimensions (DxW) 2x1 in. (50.8x25.4mm)

### TIRES

Type Yokomo micro-block rally pattern

### ELECTRICS (not included)

Motor Trinity Monsters of Touring  
Battery Sanyo 2000mAh  
ESC GM Pro reversing

## NEW-STYLE SUSPENSION ARMS

Unlike the "YR" series of on-road cars that have thick, slab-sided suspension arms, the MR-4 features svelte molded arms. Although they lack the stout, tombstone look of Yokomo's sedan arms, the composite plastic construction of the new pieces actually makes them stiffer. Threaded rod is used for the camber links and steering tie rods, and the front and rear hubs and hub carriers are lifted directly from Yokomo's MX-4 off-road buggy.

## PERFORMANCE

Yokomo sent a prebuilt, preproduction sample for photography, and I promptly took it outside for a thorough thrashing (after we finished the photo shoot, of course). I removed the interior cover before the first pack was even half depleted; as do other chassis-cover-equipped cars I've driven, the MR-4 tends to heat up the battery and motor when the cover is in place. The shielded front belt is sufficiently well protected, against most types of debris, and I feel better knowing the electronics are getting some cooling airflow. The softly suspended MR-4 handled surprisingly well on pavement despite excessive body roll, and it went where it was pointed without much fuss, although steering response felt a bit numb. Off-road, the MR-4 proved quite versatile and could be made to square turns aggressively or slide through corners sprint-car style with equal precision. The MR-4 also easily handled backyard-type play, as long as the terrain wasn't gnarly enough to high-center the chassis. Short grass was the MR-4's only threat, but the full-time 4WD made up for it, as this rally easily attacked hills and slogged through soft sand.

## WHAT'S NEXT FOR RALLY?

Now that heavy hitters Yokomo and HPI have rally cars in their lineups (and upstart OFNA has a rally version of the Z-10), can full-on, organized rally racing be far behind? I hope we'll see it happen soon, at least at the club level. These cars are too much fun to play with alone; six machines duking it out on an on-road/off-road loop would be quite a sight to see, and perhaps the most exciting new form of electric R/C racing to come along since touring cars! Is your local track making rally races happen? Drop us a line and let us know what you're up to—and send photos if you've got 'em!

Write to us at *Radio Control Car Action*, 100 East Ridge, Ridgefield, CT 06877 USA, or email us at [rcaractionquestions@airage.com](mailto:rcaractionquestions@airage.com).

\*Addresses are listed alphabetically in the Index of Manufacturers on page 209.



## Production possibility? HPI reveals 4WD buggy prototype

**H**PI recently announced tentative plans to join the 4WD off-road ranks with a new buggy roughly based on the RS4 MT stadium truck. Although information is still sketchy, we have learned that HPI may release two versions, one of which will be a Pro model well-qualified to compete on the national level. The buggy will have a chassis similar to that of the MT's but will include the requisite shorter suspension arms, 4WD-size buggy wheels and tires and, of course, a buggy body. The Pro version will probably have

molded graphite components, full bearings and MIP CVDs. HPI didn't comment on the possibility of an RS4 MT-to-buggy conversion kit, but the potential is there. As the photo shows, the folks at HPI obviously *can* build a buggy; the question they are asking themselves is: *should* they? How about it, readers; should HPI build this buggy? If so, what should it be called? Team HPI invites you to respond at its website ([www.hpiracing.com](http://www.hpiracing.com)).



## Holy Trinity!

**A**fter a slow start to the '99 racing season, Team Trinity drivers have turned on the power and swept three major competitions.



Trinity/Losi driver Brian Kinwald swept all modified classes at the Cactus Classic with wins in 2WD, 4WD and Truck. Matt Francis earned two visits to the podium for his efforts in the 2WD and 4WD classes, and Greg Hodapp took a top-three spot in Truck. This means Team Trinity drivers ended up taking two of three podium spots for each of the mods!

Meanwhile, on the other coast, Team Trinity driver Josh Cyrul swept the ROAR On-Road Carpet Nationals in all of the modified classes. He TQ'd and won in the 1/12, 1/10 and touring-car modified classes. The venerable Joel "Magic" Johnson was the number-two man on the podium for 1/12 and 1/10 modified.

Preceding the two wins on home soil, Team Trinity's David Spashett—current IFMAR 1/12 and 1/10 on-road world champ—TQ'd and won the 1/12 modified class at the European Championships.

## Enduro racing returns!

**A**n exhibition racing class was offered at the Tamiya TCS Regional Race 56 in Aliso Viejo, CA, for the company's new Toyota GT-One TS020, a scale replica of the full-size TS020 that raced in the GT 1 class at Le Mans last year. If you haven't already heard, this car features a simple, efficient direct-drive F103 RS Formula 1 chassis, but it's topped off with a sleek and sexy WSC body and Type A reinforced rubber slick tires.

Because the cars are 1/10-scale Le Mans replicas, Tamiya organized a 1/10-scale version of the 24-hour Le Mans race. Two 5-minute qualifiers determined the grid order for the 24-minute Main that included scheduled pit stops for battery-pack swaps and, if necessary, driver changes. I competed in this event, and it was one of my most memorable R/C experiences to date.

I finished in third place behind TCS national champion Mark Rebeck, which I consider to be an honor. Of course, I owe

most of my success to my great pit crew: Roy Alaán (previous TCS Mini national champion) and Thad Garner, who lapped the field and won the Mini class at the event. These guys got me in and out of the pit lane in a hurry and coached me through the entire event.

I thought that 24 minutes of nonstop racing would be exhausting, but when the race was over, I could have easily gone on another 24 minutes because it was so much fun. In fact, I didn't let my backup driver race for even a single minute (sorry, Roy).

Tamiya has not officially added this new class to the TCS roster, but as new vehicles are released, the chances of this class being added to the TCS venue will increase. (Tamiya plans to release a Porsche 911 GT 1 '98 LM soon.) I just hope that Tamiya keeps the same 24-minute racing format. And how about adding a 50 yard-dash to the drivers' stand, too?

## MIP introduces new Tweak Station for sedans

**M**IP has been secretly testing a revolutionary new chassis-tweak-setting board for touring cars that's unlike anything we've heard of. The folks at MIP have been very hush-hush about the project, so all we can tell you is that the Tweak Station uses levels and boards and that it makes adjusting chassis tweak simple and effective. Unlike setting boards, which are merely perfectly flat pieces of acrylic with scribed lines and no tools, the MIP Tweak Station will come with everything you'll need to adjust chassis tweak on most 1/10-scale touring cars at a fraction of the cost. We'll have photos and more details on MIP's Tweak Station in an upcoming issue; stay tuned.





# RACER news

By George M. Gonzalez

## INNOVATOR AT WORK

Gil

Losi Jr.

**E**ven if you aren't an R/C racer, you're probably familiar with Team Losi and the company's chief designer, Gil Losi Jr. Gil has enjoyed a long and successful professional R/C racing career, during which he has won an IFMAR World Championship and numerous ROAR national championships. He was also the first "Innovator" to be featured in our "Racer News" column, but that was more than 18 months and one world championship ago. Obviously, a lot has happened since then, and with the IFMAR Off-Road Worlds around the corner, you can bet that the Losi camp is keeping busy. I talked with Gil at the most recent Florida Winterchamps.

**R/C Car Action:** We were all very excited about the release of the NXT, which replaces the GTX as Team Losi's nitro racing truck. The GTX was marketed exclusively through Horizon Hobby Distributors, but the NXT is being offered through the same channels as the rest of the company's products. Why the change?

**Gil Losi Jr.:** When we introduced the GTX, the popularity of gas racing was still in question, and we didn't think that tooling up for an entirely new truck would be advantageous at that time. Horizon was trying to up its own OEM line and asked us to build a gas truck. Originally, they wanted a gas truck based on the Double-X platform, but we said we couldn't do that. We finally settled on the older LXT format, and since they were willing to give us a dollar commitment on how many they would buy, it was a profitable project before we even started. We felt that it offered an easy way to get into gas racing, since it did not require a lot of time, engineering and tooling, and the risk was minimal.

We did enough racing to understand what we wanted to accomplish as far as putting together a proper gas package was concerned, and it was time for us to come out with a gas truck for the entire market. We gave Horizon a certain time to market the truck exclusively, and we even extended this by a full year because they did a good job for us and moved more than enough of the product to justify the extension.

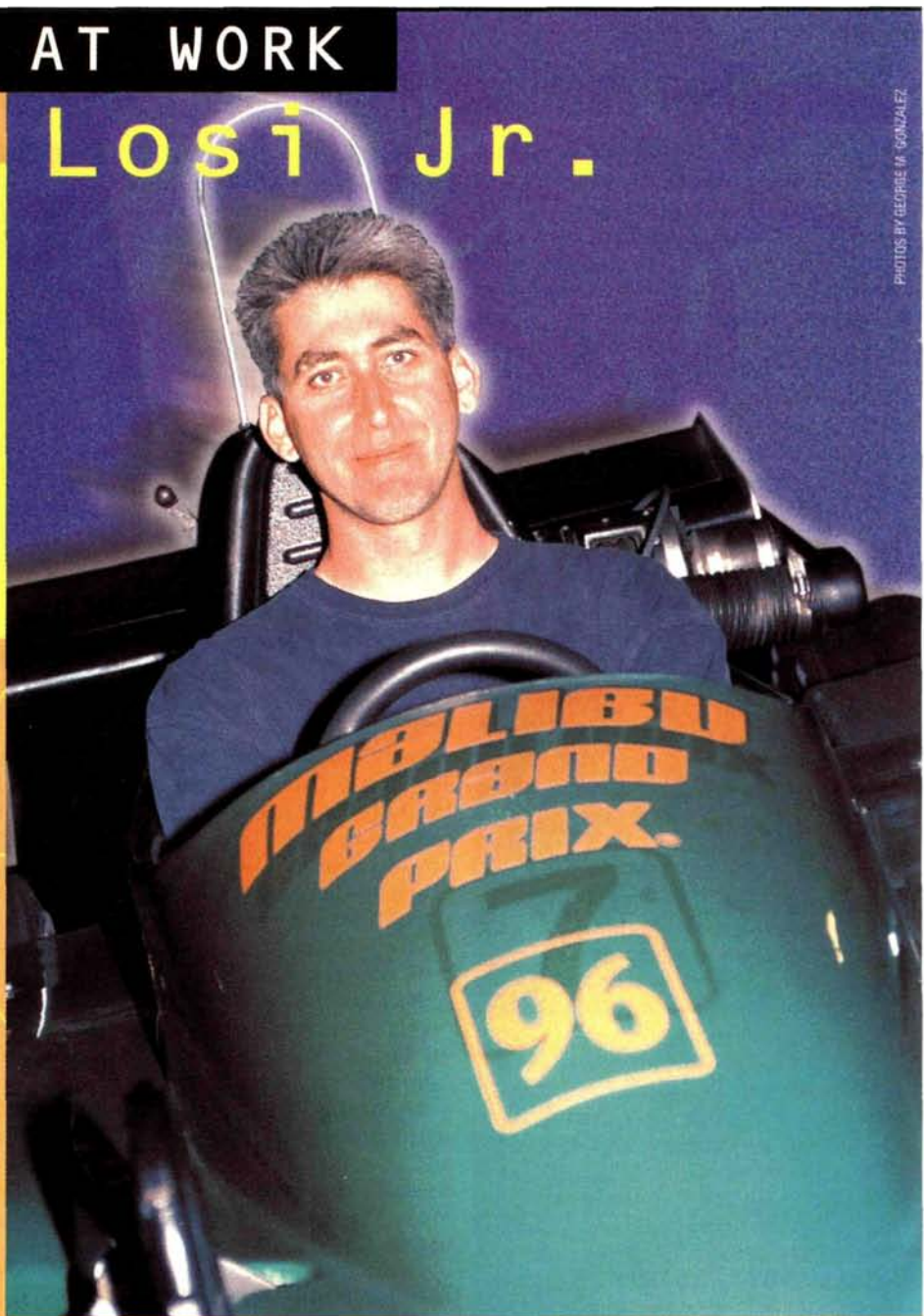
**RCCA:** Why did Losi stick with the GTX-type

format and not make a gas truck based on the Double-X platform?

**GL:** With its longer arms and narrow pivot points, the Double-X platform made it more challenging to install a traditional gearbox because of the space and gear-height requirements. Jon Anderson and Ron Rossetti have done a lot of development on the current truck, and they have it to a point where it works very well. We decided to re-release the truck with all the upgrades, so it's a dialed-in

package from the start. Besides, we didn't have to re-learn a new truck, and the vehicle had over two years of racing on it with all the setup information built in. Half the problem with building a new car is not just the design and tooling cost but the time commitment you have to make at the track learning how to make the car work in varying conditions. We had developed quite a "tuning portfolio," and that just made it easier.

**RCCA:** Now that Team Losi is back into gas,







can we expect more nitro-powered offerings?

GL: We aren't currently working on anything—other than just talking about it—but if we make a new sedan platform some day, we'd like to make something that will accept a gas engine.

**RCCA: That's interesting, but you're talking about beginners; aren't most of the people who buy Losi products such as the Double-XT 'CR' Graphite Plus experienced racers?**

GL: You'd be surprised. We sell a lot of products to first-time buyers. If you plan to go racing, it's best to pick up the best car you can. That way, you won't have to buy things twice or start all over with another vehicle.

**RCCA: The IFMAR Off-Road Worlds, which will be held in Finland this year, is rapidly approaching; are you guys already gearing up for it?**

GL: Believe it or not, the hardest part so far has been making all the travel arrangements! Travel plans are the most difficult part about going racing these days, but preparing for Finland has been especially complicated. And, yes, it's expensive to travel there. In addition, we don't have a regular distributor there with resources to help us out, and the market there is the size of a hobby shop. Fortunately, we have Jukka Steenari over there, and he has been digging around and getting information for us.

**RCCA: Will Losi have a big team at the event, or are you scaling down because of the complications?**

GL: We will have a smaller team at this year's Worlds simply because of the expenses involved.

**RCCA: Will we see any surprises at the Team Losi pit area?—if you're at liberty to say.**

GL: I hope so, but it depends on a couple of things that I'm not at liberty to discuss at this time. If we do make an announcement over there, it will be a big one, though.

**RCCA: I understand. So what are the chances of Team Losi winning back-to-back 2WD world championships?**

GL: There's always that possibility, but this race will be more difficult than any other race we've been to because we don't know what to expect from the track, and there is no way to practice on it. The track is set up once a year to race, and they've had only four races on it. The track is also on some sort of ball field, and the dirt is like the stuff that's used for baseball diamonds and does not "pack" well. They sweep through the loose stuff until they get to the bottom, where some of the



**Here's Gil sealing a deal with European distributor Carl-Günter Kuhn. Another continent conquered by Team Losi!**

fine stuff has settled and packed, and that's what you race on. Every year is different, so nobody knows which tires to use or what to expect. They also bring additional dirt to make the jumps, and that dirt is different from the rest of the track's surface, which complicates things even further.

Then there's the limited practice time. You only have six practice runs to get your car dialed in, so it's one of those races where you throw your stuff on the track and you know after a couple of packs whether you're competitive or not. I think that the drivers who have a lot of multiple-scale experience might excel at this race because I don't think it will "drive" like a normal off-road race; it will resemble more of a rally race, where some on-road experience will be helpful. I think that a control or spec tire would really simplify things dramatically at events like these. It would certainly cut shipping and storage costs!

**RCCA: The Street Weapon enjoyed quite a successful racing season last year after winning the Worlds and just about every other ROAR national championship. Will Team Losi continue to refine the car?**

GL: We're still learning how to make the car work. We have a pretty good handle on it, however, and it will work very well just about anywhere. It's very solid and will work equally well on carpet and asphalt. The only refinement or change I'd like to make is to make it easier to change spur gears.

We designed the car to have a completely sealed drive train while remaining lightweight and rigid—quite an undertaking. Every time you add a part and screws and things like that, you make the car heavier and, in some cases, weaker; that's why we designed the car the way it is. Besides, once you've taken it apart and put it back together a couple of times, it isn't any harder to work on than most cars.

**RCCA: A hot topic among racers is the emphasis manufacturers have put on racing and sponsoring large numbers of drivers. Have manufacturers gone too far or not far enough? Is racing the best promotion for the hobby?**

GL: I'll begin by saying that we didn't start this problem of having large teams; we used to go everywhere with a six-man team. As time went on, our drivers got older and were doing more things at work; most of them worked at the factory. Families and wives came into the picture, and one day, we realized that we no longer had a farm team. Some of the other teams had as many as 400 sponsored drivers, so we had to make a serious decision about whether we should continue to race at this level of competition. Do we go out and get a large team like some of the other manufacturers, or do we find another way to entice some of the better drivers who are out there racing to run our stuff? We felt that it was better for the industry to put more resources into a few people than to put a few resources into a lot of people. We've always felt that it's best not to sponsor a lot of club-level drivers because it takes away from the shops.

As far as paid or salaried drivers go, only a couple of drivers actually get paid, and they're expected to travel a lot, so they can't hold down a regular job. They are also expected to spend a lot of time at the track doing research and development as well as practicing. There are always different cars, tires, surfaces and classes, so they must spend a lot of time testing. The few drivers who put this time in are a huge part of our marketing arm. They make Team Losi successful. People who think these drivers shouldn't be paid for what they do are ... well, not very realistic.

**RCCA: That's a very compelling answer. It sounds as if there's a big difference between sponsored and paid drivers. Is that true?**

GL: There's a huge difference between the words "paid" and "sponsored." The paid guys can make a developmental impact on the company; we need them and they deserve to be rewarded. Sponsored drivers, on the other hand, run our stuff, but they do not have the same effect on the company. We do pay for all the travel expenses of a few of our sponsored drivers, but the rest of the guys must pay their own way.

**RCCA: Thanks for clearing that up for us, and thank you for your time. And congratulations to you and your wife on the birth of your beautiful baby girl, Nicole!**





# RACER news

By George M. Gonzalez

## Speed Shop

### New torque-sensing ball differential systems for 1/10-scale electric and nitro vehicles

Tactyl Differential Systems\*, a French manufacturer of full-scale, high-performance accessories, has introduced a new torque-sensing differential system for 1/10-scale nitro and electric vehicles that offers tremendous advantages over standard, ball-type, limited-slip differentials.

Tactyl's Limited Slip Differential (LSD) is a totally new concept in diffs; it automatically performs two vital functions as the car accelerates, brakes and turns. The first function is equalization of torque between both wheels, and this is accomplished by a conventional friction-ball differential; the other function is power transfer to whichever wheel has more traction. This is accomplished by means of an internal centrifugal clutch that acts like a mechanical switch.

The Tactyl LSD provides continuous automatic adjustment, depending on the torque from the motor and the vehicle's speed. The internal 4-shoe centrifugal clutch compresses the diff balls as torque is increased. Here's an example of how the diff works: let's say your car is accelerating after a sharp turn, and the inside wheel loses traction; a conventional diff would tend to "unload" and divert power to this wheel. The Tactyl system does the opposite; the internal clutch fully compresses the diff balls to provide



maximum transfer to the wheel that has more traction. When going full speed through a sweeper, however, both wheels tend to require the same amount of torque, and the centrifugal clutch regulates the amount of transfer between each wheel.

Products mentioned in "Speed Shop" aren't usually available for testing at press time, but happily, the Tactyl system was an exception. I bolted a set of front and rear Tactyl differentials onto my HPI RS4 Pro 2 and was amazed at how stable the diffs made the car feel. I was able to carry more speed through corners, and my run times increased considerably because the diffs allowed me to drive the car more efficiently. The Tactyl LSD is available for the HPI RS4 Pro and Pro 2 and will soon be available for all HPI vehicles.

Tactyl will also release systems for several Team Losi and Associated on- and off-road vehicles, as well as for selected models from Kyosho, Schumacher and OFNA. The company offers gear-type, torque-sensing differentials for Kyosho, Mugen and Thunder Tiger 1/8-scale off-road vehicles, too. No prices or part numbers were available at press time; call or email Tactyl Differential Systems for more information.

### Acer Racing Supersolder

If you compete in electrics, you know that the weakest and most power-robbing link in any R/C model is the solder joints. According to Acer Racing\*, traditional lead-based solders—even solders containing 2-percent silver—cannot match their Supersolder's conductivity; Supersolder incorporates 6-percent high-purity silver and, according to Acer, offers 1,300 percent more conductivity than lead and 141 percent more conductivity than pure gold.

Supersolder is formulated to achieve the highest tensile strength needed to endure the severe vibrations typical in a racing environment. How many times have you snapped a battery bar after casing a triple jump, only to receive a DNF? Supersolder has a low melting

point and is flux cored for easy application. Prices—\$5 (1 oz.), \$65 (16 oz.).



### O'Donnell O.S. CV .15 heat-sink head and connecting rod

O'Donnell\* has just released its machined-aluminum heat-sink head and high-performance connecting rod for the O.S. CV .15 (blue head) engine. Given the tremendous popularity of the company's cooling head and conrod for the O.S. CV .12, the new pieces for the larger-displacement mill should be a hit.

According to O'Donnell, the head has been meticulously designed and tested to provide superior cooling and power, and it is available in two models. The blue, red, purple and silver-anodized heads are designed for the longer McCoy glow plugs, while the gray-anodized head is designed for standard-length O.S. or similar glow plugs.

O'Donnell's high-performance connecting rod has been carefully machined to reduce weight, and each side of the connecting rod has been shaved to a knife-edge to reduce internal turbulence. Installing the O'Donnell head and connecting rod should result in a dramatically increased performance by the already potent O.S. .15. O'Donnell also plans to release its popular .12- to .15-size tuned pipes in various colors to match the anodized heads. No prices or part numbers were available at press time; call an O'Donnell distributor for more information.



PHOTOS BY GEORGE M. GONZALEZ





# RACER news

By George M. Gonzalez

## RACER PROFILE

## Craig Drescher

Team Associated/Team Yokomo driver Craig Drescher may not be very well known in the States, but in Europe, he's as big as Brian Kinwald is here. His picture frequently appears in the European R/C car magazines, and he's known as one of the best multiple-scale R/C drivers in the U.K. I usually get to talk to Craig only when he's competing in a world championship, so I was pleased to learn that he was in town to compete in the Invitational class at the Reedy Race of Champions. We talked during one of the breaks while he wrenched on his car.

### VITAL SIGNS

**Age:** 23

**Occupation:** Promotional representative for Associated Electronics

**Hometown:** Wolverhampton, England

**Years racing:** 13

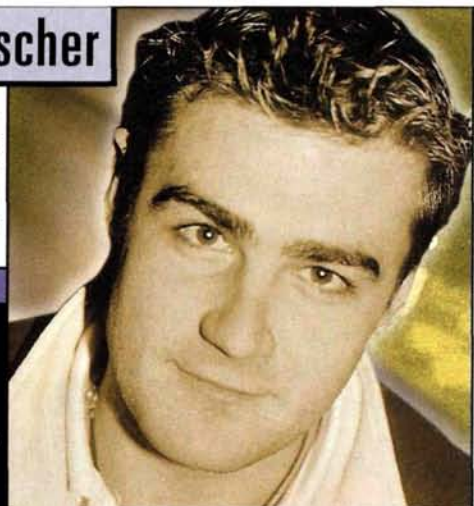
**First R/C car:** Tamiya Frog

**Favorite racing class:** 2WD off-road

**Favorite track:** "I like them all—especially American-style tracks."

**Favorite race:** Reedy Invitational Race of Champions

**Sponsors:** Associated, Yokomo, Reedy, Pro-Line, LRP, Team Orion, MIP, Kimbrough and KO



PHOTOS BY GEORGE M. GONZALEZ

**R/C Car Action:** This month, we're adding a little international flavor to the column by talking to you, Craig. How did you discover R/C racing? Craig Drescher: Many years ago, a friend got a car, and he ran it on the street; then I got a Frog for Christmas, and I played with it on the street as well. He used to race at a local club, and one day he took me with him and ... well, there you have it.

**RCRA: How long did it take to become experienced and move on to a more competitive vehicle?**

CD: I raced the Frog! It was my first race vehicle, and I raced it at clubs. I got quite good with that car. We would actually run the cars box stock with the 380-size motors as well. These days, everyone jumps straight into modified, but I think they should go through stages of progression. Start off slow; then you can go fast.

**RCRA: What's it like to travel all the way from England to compete at the Reedy Race?**

CD: It's disappointing to come to a race like this and not do as well as you want, especially when you know you could have driven better. And because things don't work out, you start to question yourself, and it's just disheartening ... I mean, I still have plenty more in me; in fact, I'm sure of that—but applying it in the right manner is sure tough at this race.

**RCRA: Some racers believe they need a great deal of luck to win the Reedy Race. What's your opinion?**

CD: I think so, too, but there's also the saying that you make your own luck, and that when things go right, they go right; and when they go wrong, they really go wrong.

**RCRA: What have you found are the biggest differences between racing here in the U.S. and in England?**

CD: The U.S. has many more facilities like M-n-M Raceway where a racer can get in tune. It makes me laugh when I hear American racers say that they have not raced in months. When they do race, they race more in two weeks than we do in an entire year. Permanent facilities are very rare in England; there are some outdoor tracks, but they're not open year-round, and sometimes, we have to wait for the grass to grow to go racing.

**RCRA: Wait for the grass to grow to go racing? You're obviously a patient bunch! So tell me, what kind of work do you do for Associated?**

CD: I'm a factory promotional representative, which means I do a little market research and feedback. It's actually quite interesting, and I enjoy it because it allows me to learn about the other side of the R/C industry. I have a degree in business management, so it's nice to be able to actually apply some of my knowledge.

**RCRA: Your father, Mike Drescher, is one of the nicest gentlemen I have ever met. He travels with you a lot, and I've noticed that you two carry on more like buddies than like a typical father and son. Do you and your father really get along that well?**

CD: We do get along really well, but if things aren't going right, we tend to get under each other's feet a bit. But my dad is really cool, and he knows that when I'm wound up, it's best just to back off and leave me alone to cool down. Actually, my father travels less and less with me these days because of his job commitment to Goodyear Racing.

**RCRA: You did very well in the ISTC World Cup event. How do you like driving touring cars? Are they becoming more popular in Europe?**

CD: Touring-car racing is definitely big in Europe. I don't think that touring cars have brought any new interest into the sport, though. Interest within the hobby has shifted; members who used to run off-road have become a little despondent because it has become expensive; so they have moved on to touring cars.

**RCRA: That's an interesting opinion. Will you be driving the Associated TC3 when it's available?**

CD: Absolutely. I'll focus my attention more on touring-car racing when I get my hands on a TC3. The new car shows a lot of potential, and I'll be driving one soon so I can give some feedback to some of the European publications. The Europeans know very little about this car, other than what they saw in the U.S. at the larger trade shows.

**RCRA: We didn't know much about the car, either, until just recently. So, what do you like to do to unwind or get away from racing?**

CD: I have a Kawasaki 600cc Ninja motor bike, which I enjoy riding. I also play squash and socialize with friends; things like that. We have a totally different social life in England. We have lots of pubs and bars that are all kind of grouped together. I also like to keep in touch with all the friends I've met throughout my years in racing.

**RCRA: Now, I must ask you this next question because every time I see you, you have a new girlfriend. And at some of the Worlds I've attended, I noticed that you go out dancing with a different girl every night. You must be the most popular guy on the dance floor—next to Joe Maloney of Maxtec, that is. What's your secret with the ladies?**

CD: That wasn't me, honest! You must have me confused with some other guy who looks like me. Well, actually, I do love the ladies, and I had a girlfriend until about two months ago. We split up on good terms. It was a long-distance relationship, and I'm kind of sorry it didn't work out because she was a very sweet young lady.

**RCRA: Hey! What are you trying to do, make up with her on my time? Just kidding. Thanks for the chat, Craig; I wish you good luck with your racing and your career with Associated.**

\*Addresses are listed alphabetically in the Index of Manufacturers on page 209. ■









TEAM LOSI AND  
RADIO CONTROL CAR ACTION  
1999

# FLORIDA WINTERCHAMPS

by George M. G.

## MARK PAVIDIS CLEANS UP IN TAMPA

**P**lagued by a freak storm that practically flooded the beautiful Lake Park facility and turned the event into some kind of late-night ESPN swamp-buggy telecast, the 1998 Florida Winterchamps won't soon be forgotten by those who were there. This year, nature was much kinder—except for a two-hour downpour on Sunday that threw a monkey wrench into the schedule and completely changed the track conditions. (In the Mains, some unlucky drivers had to race on mud without any practice.)

For the most part, though, racers enjoyed comfortable 75-degree sunshine and didn't have to be flown in by helicopter each morning. The spectators who filled the two large bleachers on either side of the track were treated to some of the hottest R/C racing on the East Coast. Add to this Lake Park's beautiful scenery and the West Coast R/C Club's (they happen to live on the East Coast; go figure) awesome R/C track and you have the making of an enjoyable and exciting R/C adventure. No wonder this event is so popular.

A few of the Team Losi guys take a break and watch the action in the 2WD Stock class.



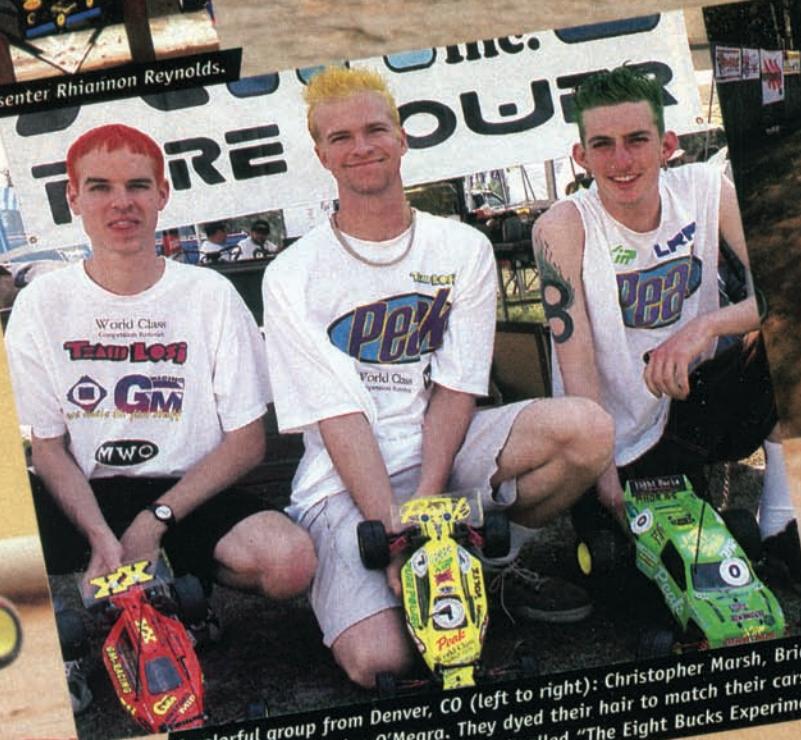
PHOTOS BY GEORGE M.



The action on the drivers' stand.



Trophy presenter Rhiannon Reynolds.



A colorful group from Denver, CO (left to right): Christopher Marsh, Brian Westerman and Paige O'Meara. They dyed their hair to match their cars, and they're musicians who play in a band called "The Eight Bucks Experiment."





## STOCK-CLASS CHAMPS SPEAK UP

When the dust had settled and the trophies had all been handed out, I pulled the 2WD Stock and Stock Truck champions

aside for an impromptu interview. Kraig Krueger (above), 2WD Stock champion, is

fully sponsored and knows what it's like to compete at large, sanctioned events.

Stock Truck champ, Josh Knight (left), on the other hand, is unsponsored (for the time being, anyway), but he thanks the guys at Peak Performance for all their support.



### R/C Car Action:

**Congratulations on an awesome performance. Was this your first big win?**

Kraig Krueger: No, but it is the biggest win.  
Josh Knight: Yes.

**RCCA: Was this your first Florida Winterchamps?**

KK: This is the fifth year I've attended.  
JK: I was also at the last Winterchamps.

**RCCA: How was the action in the classes you competed in?**

KK: It was fairly tough but not as tough as the changing track conditions.  
JK: It was pretty hard, but it got easier as the track got faster.

**RCCA: Who was your toughest competitor?**

KK: Probably Joey Stanovich; he had the fastest lap times during qualifying, but he ate dirt during the Mains.  
JK: I'd have to say Eric Pesto. He is a national champion, and he made things tough for me both on and off the track.

**RCCA: How did track conditions change during the event?**

KK: The track conditions changed drastically—especially after it rained and the track got wet. It got faster and faster as time went on, then when it rained, it got much slower. My Main came directly after the rain, which caused my car that once had plenty of

steering to push like mad. It was tough because I had to change the way I drove the car, which was totally experimental.

JK: The track conditions did change quite a bit, but fortunately, my Main came just before the rain, so I had finished before the track turned into a mud bowl.

**RCCA: How did you like the new scoring system? Do you think it was fair?**

KK: I like the new system and thought it accomplished what it was intended to do: stop the rocket rounds.  
JK: It was OK, but I think it was tailored more for the Modified class or pro drivers. I had the fastest heat time, which should have given me the TQ, but Eric Pesto's more consistent time got him the TQ.

**RCCA: Were you a little nervous before the Main?**

KK: A little, but as soon as I heard the announcer mention my name, I somehow relaxed a bit.  
JK: Yeah, but Eric Pesto was goofing off on the drivers' stand, and that relaxed me a bit.

**RCCA: Will you guys be at the next Florida Winterchamps?**

KK: I hope so.  
JK: I will do everything I can to attend the next event.

**RCCA: Thanks for your time, guys, and good luck at all of your future races.**

## A NEW RACING FORMAT

The 1999 Winterchamps used a new scoring system that was designed to eliminate what has become known as "rocket-round qualifying." As the event progresses, the track becomes increasingly faster (better traction), and that gives racers in the final qualifiers an advantage over those who ran when the track was still developing a groove. Later racers ran their final rounds when the track was at its "fastest"—they had rocket rounds.

Here's how the new system works:

Each class had three rounds of qualifying, and drivers earned points according to their finishing position: TQ, 0 points; second, 1 point; third, 2—and so on. A driver's worst finish (highest score) was then thrown out and the remaining scores combined (much like ROAR's format, though this isn't a ROAR-sanctioned event). A driver's best two finishing times were combined to be used as a tie breaker.

The driver with the lowest score was given the TQ designation and the pole position on the starting-line grid for all three A-mains (though single A-mains determine the outcome of the Stock classes). The Mains were scored in the same way as the qualifiers: a driver's lowest two scores and lowest two race times were combined to determine a final score and settle any ties. With this new scoring system, the driver with the fastest time doesn't necessarily take the TQ; the driver who drives the most consistently during all of his qualifiers gets the prime grid spot.

## A-MAIN ACTION

• **Stock Truck.** When the announcer sounded the starting tone, a giant thunderstorm came out of nowhere and threatened to cancel everybody's good time; the skies darkened, the wind picked up and lightning threatened. All we could do was hope the rain would hold off long enough to finish the Stock Mains and the final round of the Modified Mains.

In the first turn, TQ Eric Pesto steered his Kamikaze-powered Team Associated RC10T3 clear of a giant pileup. Joey Stanovich's and Danilo Rodriguez' trucks were the first to be untangled, and they were soon on Pesto's tail. Going through the triples on the first lap, Pesto made a mistake that cost him the lead and put him in fourth behind Josh Knight, who was flanking the leaders and waiting for an opportunity to strike.

Stanovich was now in the lead followed by Rodriguez and Knight. Rodriguez tried to make a pass on Stanovich, but Stanovich closed the door while going down the straightaway just as the two trucks entered the sweeper. Unfortunately, Rodriguez traction-rolled and put the leader, Stanovich, into second; Rodriguez was out of the race with a broken truck. Josh Knight was now in the lead with TQ Pesto on Stanovich's tail. Toward the end, Knight started to turn it on and soon had a comfortable lead. Meanwhile, Stanovich didn't have it so easy in second, as Pesto and Kraig Krueger, who came out of nowhere, pursued him with great tenacity.

Knight and Pesto were the only two to cross the line before the end-of-race buzzer and, as a result, they squeezed in an extra lap. Even though the race was over for the rest of the field, it was still on for them. Knight had a huge lead, though, so he just cruised around, being sure not to take any chances that would cost him the win. He held his position while Pesto and Krueger finished second and third, respectively.

The stock trucks were just able to finish before the skies opened and gave us a downpour—the other type of weather for which Florida is famous, or infamous, depending on how you look at it.

• **2WD Stock.** This was run right after a 2-hour rainstorm, and although the track crew tried to dry the surface, it was a mud bowl. That didn't stop TQ Kraig Krueger's Reedy-powered Team Associated B3 from shooting out in front, never to be challenged. The real battle was for second: Brian Westerman and Ryan Eckert were both driving Team Losi Double-X 'CR's.

With 2 minutes down, Krueger stretched his lead while Westerman settled into second and Eckert patiently waited it out in third. Less than 1 minute later, Westerman hit a pipe going into one of the corners; he recovered quickly, but Eckert was all over his tail by then. Moments later, coming out of the last corner, Eckert made an amazing pass to claim second, but he almost lost it seconds later when he rolled onto his lid. Thanks to some quick turn-marshalling, Eckert held on to second; Kraig Krueger won easily—the race and the championship; and Brian Westerman had to settle for third.

• **2WD Modified.** First leg: after the dust had settled on the first lap, Team



## WINTERCHAMPS

Trinity drivers Brian Kinwald and Matt Francis claimed first and second. TQ Mark Pavidis was in third—a full second behind the leaders—while Team Schumacher's Teemu Leino and Scott Hughes battled for fourth. The race finished as it had started: Kinwald, Francis, Pavidis.

*Second leg:* Pavidis, Kinwald and Easton entered the first corner in that order, but

to determine the overall winner. Pavidis had a good start, but Kinwald and Matt Francis were close behind. Easton reeled in the lead group, made a brilliant pass on Francis and found himself behind Kinwald. Soon, the battle between Kinwald and Easton started (no doubt, these guys are avowed rivals).

Easton tried to make a bold pass on Kinwald and ended up punting the world champ out of the way to claim second—which I somehow don't think Kinwald appreciated too much. Of course, Kinwald came back with a vengeance

the last lap. Though he quickly recovered, it wasn't soon enough, as he could do nothing but admire Easton's tailgate as his truck crossed the line to claim third. Of course, Easton finished in second and Pavidis, who was never really challenged, took the win and the overall championship.

• **Modified Truck.** *First leg:* Team Associated driver and TQ Scott Hughes led the pack around the first sweeper with



when the pack rounded the last turn, Pavidis was in first, Matt Francis in second and Brian Kinwald in third. Moments later, Kinwald was on his lid, and Easton squeezed by into third. On the very last lap, Francis made a mistake that opened another door for Easton. Pavidis took the win with Easton in second and Francis in third.

*Third leg:* in the overall standings, going into this final round, Pavidis was up on points, but a win for Kinwald would tie things up again, and the drivers' fastest lap times would be factored in



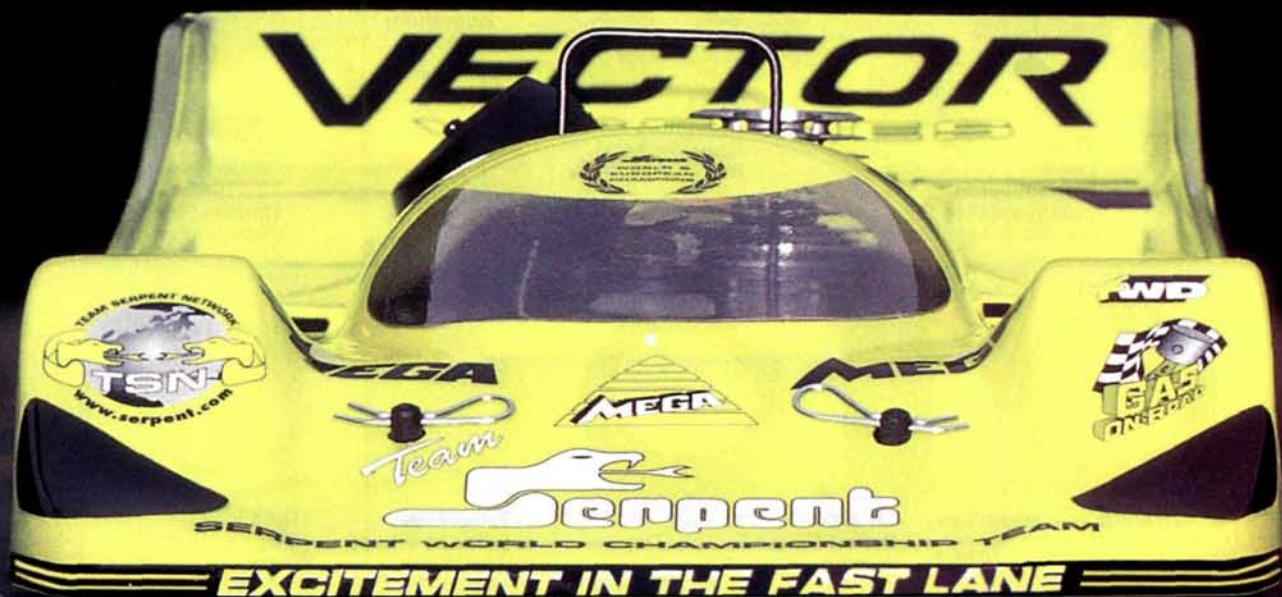
and was all over Easton like an angry hornet. Within seconds, Kinwald was back in second, but Easton pushed and shoved his truck in an effort to regain second place. I was surprised that the two didn't drop their radios and push each other around on the drivers' stand!

Kinwald got the short end of his joust with Easton and ended up on his lid during



**Check out this action sequence because there's a valuable lesson to be learned. Here's a typical pileup. Notice that car no. 8 tries to break free by running over car 9. The turn marshal gets there and car 8 tries to break free again—by running over the turn marshal! The marshal picks up no. 9 and no. 7 and sends them on their merry way while car 8 ends up on its lid. The lesson: in a pileup, let off the throttle and let the turn marshal do his job!**

# PURE EXCITEMENT VECTOR Spec 99



Serpent USA, Inc. West Park Center 2832 NW 79th Ave. Miami, Florida 33122  
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teammate Mark Pavidis in tow. Billy Easton settled into third, giving the A-team the top three positions. The three continued in this order until Hughes let teammate Pavidis pass him going through the triple jumps. Pavidis took first, Hughes claimed second and Easton rounded out third.

**Second leg:** Hughes once again shot out in front with Pavidis right on his tail, but this time, Trinity driver Mark Francis claimed third and Easton fell into fourth. On the second lap, Francis rolled, and that sent him back to eighth; Pavidis stuffed a pipe and was then in third behind Easton, now in second.

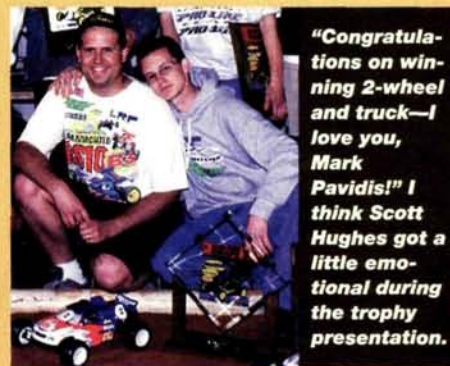
At around the halfway mark, the running positions really started to change: Brian

Kinwald, who had been riding in the back, made his way to third, and Pavidis made a beautiful pass on Easton to claim second. Easton somehow found himself behind Kinwald, and it was obvious to the spectators that he wasn't happy to be following Kinwald yet again.

Meanwhile, Hughes had gone in a blaze of glory, and Pavidis, in second, started to make some space between his truck and the rest of the field. Easton tackled Kinwald throughout, and they swapped positions several times; in the end, though, it was the great Kinwald who finished third. If you haven't guessed, Hughes easily won the second leg and Pavidis claimed second.

**Third leg:** going into this final round, Team Associated's Hughes and Pavidis were tied on points. This time around, Pavidis got the holeshot and claimed first early on, while Easton tucked in to claim second and Mark Francis stuck it out in third. A bad start put Hughes in the nose-bleed section.

Pavidis soon had a good lead, and the battle for second was between Easton and Francis. Matt Francis—in fourth the entire time—was also trying to get in on the action. A rivalry between the Francis brothers led to them tangling going into a



**"Congratulations on winning 2-wheel and truck—I love you, Mark Pavidis!" I think Scott Hughes got a little emotional during the trophy presentation.**

corner, and this let Kinwald sneak by to claim second.

At the end-of-race buzzer, Pavidis had the win and the overall championship. That made two Florida Winterchamps victories in one weekend; he's having a good year. Kinwald finished second in the third leg, but after the points had been tallied, he was in third overall behind second overall winner Hughes.

• **4WD Modified.** **First leg:** Team Losi/Team Orion driver and TQ Jukka Steenari shot out in front with a vengeance and put some space between his car and the rest of the pack in an awful big hurry. Team Associated/Yokomo

# PURE EXSITEMENT

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driver Scott Brown followed in second and, at a distance, Brian Kinwald was in third—and that's how they finished. Steenari and Brown crossed the line before the buzzer and ran a victory lap.

**Second leg:** Steenari was clearly on a mission, as he once again shot out in front and waved goodbye to all his competitors. Brown again settled into second,

while Kinwald stuck it out in third. This might sound like a repeat performance of the first leg, but things soon changed significantly.

A mix-up going through one of the corners sent Brown back to fourth, while Matt Francis came from behind to claim second and Teemu Leino worked his way to third. And that's how the race ended;

Steenari had now won two in a row, which earned him the championship and the luxury of sitting out the third leg while the other racers battled to determine the rest of the order.

**Third leg:** Steenari had already won the championship, but the silver and bronze medals were still up for grabs. After a few blunders during the first lap, Leino



## Schumacher Worlds Car

Schumacher\* unveiled its new Fireblade 2000 USA "Worlds Car" at the Florida Winterchamps, but because it's so new, Schumacher team driver Teemu Leino did not want to jeopardize his performance by having to dial in a brand-new car. The Fireblade did make a shakedown run in the hands of other drivers, and it looked very refined on the track.

The most notable new features are the revised gearbox and motor mount that allow the motor—a good portion of the car's total weight—to be mounted farther forward on the chassis for improved steering. Speaking of steering, you may have noticed that the steering servo is now mounted horizontally (instead of vertically, as in the previous car), and that lowers the car's overall CG.

**new  
in the  
Pits**

## Serious Traction à la Pro-Line

Pro-Line's\* newly released tire treads made a big splash in the pits and in the winners' circle. Pro-Line's new Blade front truck tire is like a front and rear tire rolled up in one: half of it has a square-pin tread similar to the tread pattern of the company's world-championship-winning Square Fuzzie and Holeshoot line of tires; the other half has multi-angle ribs like those on Pro-Line's Edge front tire. These tires were designed for firm to hard-packed track conditions and were used by Team Associated driver Mark Pavidis to win the Modified Truck championship.

Pro-Line also introduced its new Super Square buggy and truck tires; they were specifically designed for racing on blue-groove, hard-packed tracks with a light dust buildup. These tires feature an ultra-large contact patch to increase traction, new internal webbing support and a new small pin and separation design with middle paddle support to increase forward acceleration. The Blade front truck

tires and Super Square buggy and truck rear tires are available in Pro-Line's M2 and M3 compounds and include oversize high-density foam inserts.



## HAVE R/C CAR WILL TRAVEL

**P**robably the most enjoyable aspect of my job as an R/C Car Action editor is that I travel all over the world to R/C racing events and meet new people. It's always interesting to talk to racers who have come from afar because they invariably have interesting stories to share. The Florida Winterchamps draws racers from all over the USA and from all around the world; this year, they came from as far as Germany, Finland and Venezuela. We all left with fond memories and new stories to tell friends and families back home. Here are just a few of the cool people I met in Florida who traveled great distances to compete at the Winterchamps.



**Team Venezuela.** It was great to talk to these guys; it also gave me a chance to brush up on my Spanish (or is it Spanglish?). This was their fourth Florida Winterchamps.

**Team Germany.** These guys were not only fast, but they were also the most boisterous guys in the group; no doubt, they know how to have fun!



**Team Rainbow Motorsports** traveled down from South Carolina to join the fun. The custom trailer shown here is a hobby workshop that they take with them wherever they race. There's nothing

like having all the comforts when you travel!



FIN.	QUAL.	DRIVER	CHASSIS	MOTOR	BATTERY	ESC	RADIO	BODY	TIRES(F/R)	GEAR RATIO
<b>2WD STOCK</b>										
1	1	Kraig Krueger	Associated	Handout	Reedy	Tekin	Airtronics	Associated	Pro-Line	NA
2	7	Ryan Eckert	Losi	Handout	Mad Dog	Novak	Airtronics	Losi	Pro-Line	23/84
3	3	Brian Westerman	Losi	Handout	World Class	Tekin	Airtronics	Losi	Losi	21/84
4	4	Eric Pesto	Associated	Handout	Kamikaze	Novak	Airtronics	Pro-Line	Pro-Line	22/83
5	6	Andy Smolnik	Associated	Handout	Reedy	LRP	Airtronics	Pro-Line	Pro-Line	22/84
6	5	Todd Lewis	NA	Handout	NA	NA	NA	NA	NA	NA
7	10	Jinson Collins	Losi	Handout	Team Orion	LRP	Airtronics	Pro-Line	Pro-Line	23/84
8	9	Justin Morrison	Losi	Handout	Team Orion	Novak	Airtronics	Losi	Losi	21/82
9	8	Robbie Boles	Losi	Handout	Wizard	Novak	Futaba	Pro-Line	Pro-Line	19/84
10	2	Joey Stanovich	Losi	Handout	Trinity	Novak	Airtronics	Losi	Losi/Pro-Line	21/82

<b>TRUCK STOCK</b>										
1	2	Josh Knight	Associated	Handout	Peak	Novak	Airtronics	Associated	Pro-Line	18/87
2	1	Eric Pesto	Associated	Handout	Kamikaze	Novak	Airtronics	Associated	Pro-Line	18/87
3	5	Kraig Krueger	Associated	Handout	Reedy	Tekin	Airtronics	NA	Pro-Line	18/87
4	6	Joey Stanovich	Losi	Handout	Trinity	Novak	Airtronics	Losi	Losi/Pro-Line	21/82
5	3	Kyle Skidmore	Associated	Handout	Reedy	LRP	Airtronics	Pro-Line	Pro-Line	19/87
6	9	Paige O'Meara	Losi	Handout	XIPP	LRP	Airtronics	Losi	Losi/Pro-Line	21/88
7	4	Chad Bradley	Associated	Handout	Reedy	LRP	Hitec RCD	Pro-Line	Pro-Line	17/87
8	10	Jerry Dean	Associated	Handout	Reedy	Novak	Airtronics	Associated	Pro-Line	19/87
9	8	Justin Morrison	Losi	Handout	Team Orion	Novak	Airtronics	Losi	Losi	20/88
10	7	Daniel Rodriguez	Associated	Handout	Team Orion	LRP	Airtronics	Associated	Pro-Line	19/87

<b>2WD MODIFIED</b>										
1	1	Mark Pavidis	Associated	Reedy	Reedy	LRP	Airtronics	Pro-Line	Pro-Line	18/81
2	2	Brian Kinwald	Losi	Trinity	Trinity	Novak	Airtronics	Losi	Losi	21/84
3	4	Billy Easton	Associated	Reedy	Reedy	LRP	Airtronics	Associated	Pro-Line	19/81
4	3	Matt Francis	Losi	Trinity	Trinity	LRP	Airtronics	NA	NA	NA
5	10	Scott Hughes	Associated	Reedy	Reedy	LRP	KO Propo	Pro-Line	Pro-Line	19/8
6	5	Teemu Leino	Schumacher	Team Orion	Team Orion	LRP	Sanwa	Schumacher	Pro-Line	17/89
7	8	Jukka Steenari	Losi	Team Orion	Team Orion	Novak	Airtronics	Losi	Losi	19/84
8	6	Mark Francis	Losi	Trinity	Trinity	NA	NA	NA	NA	NA
9	7	Quincy Hughes	Losi	Peak	Peak	Tekin	Airtronics	Losi	Losi/Pro-Line	19/84
10	9	Marcus Luebke	Schumacher	Team Orion	Team Orion	LRP	Sanwa	NA	Pro-Line	20/92

<b>1WD</b>										
1	1	Jukka Steenari	Losi	Team Orion	Team Orion	Novak	Airtronics	Losi	Pro-Line	18/84
2	4	Brian Kinwald	Losi	Trinity	Trinity	Novak	Airtronics	Losi	Losi	18/84
3	5	Matt Francis	Losi	Trinity	Trinity	LRP	Airtronics	NA	NA	NA
4	3	Teemu Leino	Schumacher	Team Orion	Team Orion	LRP	Sanwa	NA	Pro-Line	16/89
5	2	Scott Brown	Losi	Trinity	Trinity	Novak	JR	Losi	Losi/Pro-Line	20/84
6	6	Jimmy Babcock	NA	NA	NA	NA	NA	NA	NA	NA
7	7	Billy Easton	Yokomo	Reedy	Reedy	LRP	Airtronics	Yokomo	Pro-Line	17/84
8	8	Mark Pavidis	Yokomo	Reedy	Reedy	LRP	Airtronics	Yokomo	Pro-Line	17/84
9	9	Dave Graboski	NA	NA	NA	NA	NA	NA	NA	NA
10	10	Jason Corl	Losi	Trinity	Trinity	LRP	Airtronics	Losi	Losi	19/86

<b>TRUCK MODIFIED</b>										
1	2	Mark Pavidis	Associated	Reedy	Reedy	LRP	Airtronics	Pro-Line	Pro-Line	18/87
2	1	Scott Hughes	Associated	Reedy	Reedy	LRP	KO Propo	Pro-Line	Pro-Line	18/87
3	7	Brian Kinwald	Losi	Trinity	Trinity	Novak	Airtronics	Losi	Losi	18/88
4	3	Billy Easton	Associated	Reedy	Reedy	LRP	Airtronics	Associated	Pro-Line	17/87
5	9	Matt Francis	Losi	Trinity	Trinity	LRP	Airtronics	NA	NA	NA
6	8	Rob Schaffer	Losi	Peak	Peak	Tekin	NA	Losi	Losi/Pro-Line	18/88
7	5	Jukka Steenari	Losi	Team Orion	Team Orion	Novak	Airtronics	Losi	Losi/Pro-Line	20/88
8	6	Mark Francis	Losi	Trinity	Trinity	NA	NA	NA	NA	NA
9	10	Alex Guerrero	Losi	Team Orion	Team Orion	Novak	Airtronics	Losi	Losi	18/88
10	4	Jason Ruona	Associated	Reedy	Reedy	LRP	NA	NA	Pro-Line	NA

claimed the lead and was followed by Mark Pavidis and Matt Francis. Pavidis and Francis shot down the straightaway and were bumper to bumper with Francis as they entered the sweeper. Francis practically used Pavidis' car as a guardrail, and he pushed it out of the way long enough for Kinwald to settle into second. Francis found himself in third.

Soon, Kinwald was making his way toward Leino, who was in the lead, but time was running out, and there was no way Kinwald would catch him in time—

unless the leader crashed, that is. And he did: Leino's car rolled on the last corner, and Kinwald raced by to take the win. Leino took second and Francis secured third. As you know, Steenari won the first two legs to take the overall championship, Kinwald ended up in second overall, and Matt Francis was in third.

### FINAL THOUGHTS

The 1999 Florida Winterchamps was everything I expected. Most of the time, the weather was awesome, the track was

as professional as they come, and the racing action was the best. The folks at the West Coast R/C Club did a great job; they kept things running quickly and smoothly, and we all appreciated it. We congratulate Team Associated driver Mark Pavidis and Team Losi's Jukka Steenari on their Modified wins and Josh Knight and Kraig Krueger for winning in Stock.

I hope to see you all there next year.

*\*Addresses are listed alphabetically in the Index of Manufacturers on page 209.*









**H**ere it is: the follow-up that you've been looking forward to. It's time for part 2 of the Double Trouble Dual Engine Nitro USA-1 project I began in the last issue—a perilous pairing of two Picco\* .21 engines, Kyosho\* MP-5 and USA-1 chassis components and a lot of custom work. As promised, I'll show you how I set up the throttle linkages and placed the servo, and I'll detail all the finishing touches. The action shots show that this truck is packed with power and can pump

out some serious speed (the numbers come later). So let's not delay any longer; it's time to see what brings this monster to life.

by Greg Vogel



# PROJECT DUAL ENGINE





PHOTOS BY STEVE POND AND WALTER SIDAS

# INE USA-1

## DOUBLE TROUBLE PART 2



## PERFORMANCE

After two months of planning and building, the truck was at last finished. I packed up my gear and went to our office parking lot to break in the engines. With the help of Senior Editor Steve Pond, I set both carburetors equally, filled the tanks and fired one engine, figuring it would be easier to tune the engines individually. Since both mills had been broken in before they were installed in the truck, it didn't take long to get them both fired up and dialed in. Let me tell you, nothing sounds cooler than two engines rumbling in one truck! After a few blips of the throttle, the engines seemed to "sync up," and Project Double Trouble was go for launch.

Steve dropped the truck onto the ground and I yanked the throttle. Most of the power was transferred immediately to the front wheels because of the center differential. We had overlooked this problem during the truck's design stages but quickly thought of an easy solution. I took the truck to the workbench and replaced the center diff with Nuova Faor's diff bypass unit. After the quick installation, we fired up the truck again. The torque of the two engines instantly broke all four wheels free of the ground. This monster has tons of power!



We had to take the truck out for some fun, and the beach was the hot spot for off-road action. A tall rooster-tail of sand sprayed from each tire as I tore along the beach, and every turn sent a tidal wave of sand into the air. Jumping this dual bad boy is another story; it gets a little hairy when I set up for some air time. When I kept the throttle clamped, the truck wanted to flip and land shiny side down; but when I let up on the gas after take-off, it floated level through the air.

After we had gone through half a gallon of fuel, we inspected the truck for wear. The clutch bells and main gear had taken a beating and ridges had worn in the teeth, but the rest of the truck was in perfect condition.

Our next challenge for the dual monster was a speed run, and there isn't a better place for this test than the Sikorsky Memorial airport in Connecticut. A few quick passes to get the engines up to running temperature also let me know that its wide track and short wheelbase would make it a handful to control at high speeds. But we had to try a speed run with this dual-21-engine truck. I pulled the trigger, and Steve fired the radar gun. As it blew past him, the truck reached the outrageous speed of 54.6 mph. But (yeah, there's a but), that still wasn't fast enough for us. We quickly thrashed on the truck and dropped in two, 16-tooth clutch bells and a new throttle bar to accommodate the change in engine spacing. The engines quickly fired to life, and we went for another all-out run. I sent the truck down the runway till I could barely see it, turned it around and pulled the trigger. The wheels grew extremely large and the truck blew by the radar gun at a 67mph. Now, I'd say that's impressive for a monster truck, wouldn't you?

## OPTIONS • PART 2

### KYOSHO

- 13T clutch bells (2)—part no. KYOC 4205.
- Flywheel nuts (2)—KYOC 3532.
- Tuned-pipe mounts (2)—KYOC 4650.
- M4 flat-head washers—KYOC 9847.
- M3 flat-head washers—KYOC 9846.

### HAMMAD GHUMAN

- VLT 0.9 clear shocks (4 pairs)—5346.
- Shock mounts (2 packs)—5201
- Spring clamps (4 pairs)—5211.
- No. 2 pistons (2 packs)—5221.
- Spring retainers (2 packs)—5230.

### LOSI

- 2.5 springs (4 pairs)—A-5160.
- Shock cartridges (8)—A-5015.

### MIP

- MP-5 clutch kits (2)—1255.
- Golden shock shafts (8)—1052.

### MUGEN SEIKI

- Manifold—C0950.
- Manifold gasket—C0904.
- Manifold spring—C0903.

### O.S.

- Super air cleaners (2)—OSMG2380.
- No. 8 glow plugs (2)—OSMG2691.

### PARIS

- High-energy quiet pipes (2)—AL 650.

### NUOVA FAOR

- Chrome main gear—NVFK23
- Aluminum center diff bypass—NVFR18

## STEERING LOCATION

Because I didn't use the stock radio plate, I had to relocate the steering servo (just as I had done with the throttle servo). To clear the gas tank, I had to use a short Du-Bro® composite servo horn; this reduces throw, but I'll compensate for this when I adjust the transmitter's steering end-points.



*I used Nuova Faor's diff bypass unit in place of a center diff.*

*Without the diff, the front and rear gear-boxes are given*

*equal power. I also used Nuova Faor's chrome-plated steel main gear.*



## BODY LANGUAGE

I needed something radical to top off my project, so I selected Pro-Line's® Ford F-150 body sprayed with Parma's® new Faskolor paints. As you can see, Parma has some wild colors that really stand out. The roll bar was sponged from the USA-1 body kit; I had to heat and cut some plastic to make it fit, but it was worth the extra effort.

*Kyosho's upper turnbuckles replace the stock adjustable upper arm. This may allow the suspension arm to flex more, but who cares?; this is a monster truck.*



## THROTTLE LINKAGE

Throttle-linkage installation was a little tricky, as the right engine's clutch bell ate up the space usually occupied by the servo. I drilled four holes in the chassis to accept Losi\* NXT plastic standoffs, which I used to position the servo directly in front of the right engine. Du-Bro's long, composite servo horns actuate the carb slides; I used the long, two-sided horn along with another horn bolted to the carburetor side to act as an extension. A U-shaped piece of music wire with soldered-on threaded couplers and ball cups was used to open both carbs at the same time. If you attempt to replicate this project truck, be sure to install the stop collars and spring before you bend the music wire into shape. I repositioned the eyelets for the brake cams to accommodate the servo's new position. I also had to remove one fiber brake disk from the rear because it interfered with the flywheel. Four would have been nice, but three disks are enough to bring this monster to a stop.

## ENGINE PREP

I equipped both Picco engines with an MIP\* flywheel and clutch, and gave the crankshaft two, 13-tooth Kyosho clutch bells and 5x10 bearings for support. I bolted the engine to Kyosho's purple-anodized engine mounts and then to the chassis. Two Mugen Seiki\* manifolds direct the exhaust to the Paris\* AL 650 pipes. The Mugen headers can be used on either side of the chassis. Instead of the original 125cc tank, I chose to feed the dual powerplants from two 75cc fuel tanks. It's easier than trying to feed the two engines

from a T-fitting and one tank; besides, it goes well with the "dual" theme.



## SHOCKS

The USA-1 uses two shocks on each suspension arm—another good match for the "two-of-everything" theme. I can't leave anything stock; I replaced the original dampers with Hammad Ghuman's\* (HG) Losi-type VLT (very low turbulence) clear shocks complete with HG's aluminum collars and spring perches. These Lexan wonders spice up the truck's looks and operate smoothly. I built up the shocks with MIP titanium shock shafts, Losi Certified 40WT oil and no. 2 HG VLT pistons. Losi blue springs provide the boing for the dampers.



The throttle linkage looks a little complicated. It took me hours to make linkage that wouldn't bind the slide carbs. Notice the second bar soldered to the couplers. This prevents the linkage from bending during braking.



Here's a close-up of the steering servo's position. There isn't much room on the chassis for the electronics; as you can see, I mounted the Hitec\* DCX receiver on the side of the Futaba servo and the DuraTrax\* 1100mAh battery on the front brace.

## FINAL THOUGHTS

See what can be accomplished with a little imagination and hard work? I went a little over the top, but any car can become an interesting project vehicle. Take a look at the cars and trucks you have lying around your house; each one is waiting to be manipulated and hacked into an outstanding project.

What can you conjure up? Send us photos of your projects, and if you have an idea for a project you would like to see in *R/C Car Action*, write to us at 100 East Ridge, Ridgefield, CT 06877-4606 USA, or email: [rccaractionquestions@airage.com](mailto:rccaractionquestions@airage.com).

\*Addresses are listed alphabetically in the Index of Manufacturers on page 209. ■



# Oval Tuning Basics

by Ryan and  
Kirby Hand



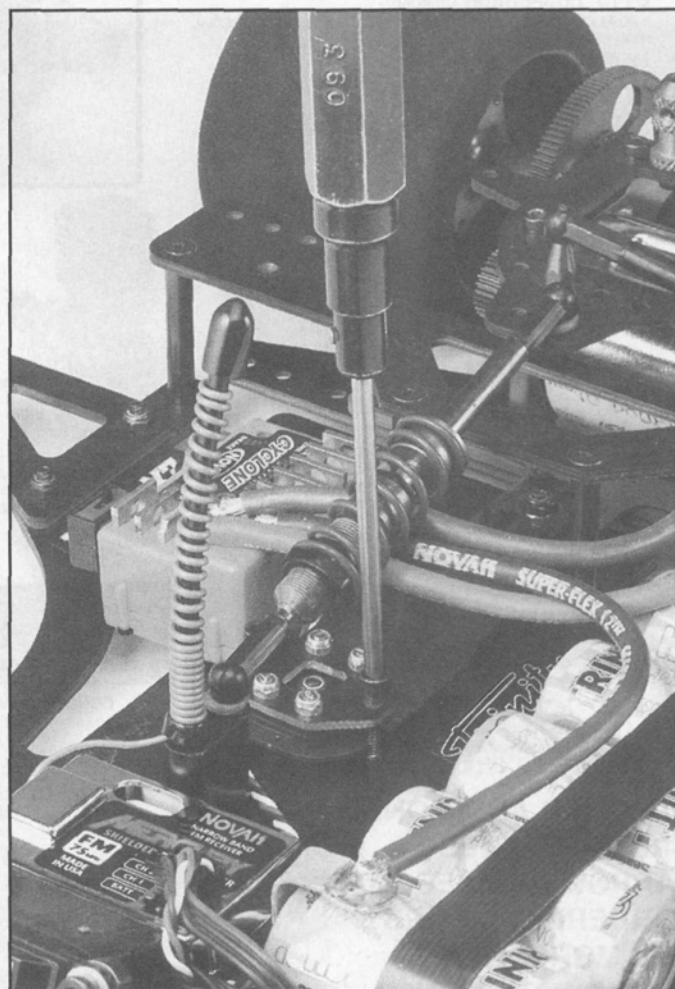
## Lessons in turning left

**T**o the uninitiated, oval racing may not appear to be very complex or challenging. After all, these somewhat simple-looking cars race on smooth courses and only have to turn in one direction. Yet the maneuvering you see on an oval track may well be the easiest part of oval racing! What the casual observer does *not* see is the amount of preparation that goes into this seemingly simple performance.

Despite the relatively unsophisticated look of an oval racer, it is likely the most “setup intensive” car you can race. Why? The high number of laps in an oval race—under track conditions that are generally more consistent than in other types of racing—cause even the slightest weaknesses in setup to be dramatically revealed. An industry notable once referred to oval cars as “rolling dynos” because even the most minuscule chassis adjustment will be reflected in performance.

We recruited the help of Team Trinity’s Ryan and Kirby Hand—two of oval racing’s fastest brothers—to shed some light on the magic of oval-car tuning. Their tips focus on the popular direct-drive pan cars that are most prevalent in oval racing, but the basic principles outlined here apply to just about any type of chassis.

Ryan, the “chassis man” of the duo, outlined the adjustments that should be made when setting up for optimum performance. The brothers then fleshed out the details. There are certainly exceptions to any general setup rules, but the processes outlined here will help you optimally tune most cars for typical track conditions. Whether you are new to oval racing or have been at it for some time, you’re likely to benefit from the Hand brothers’ advice.



### INITIAL SETUP

The initial chassis configuration is one of the most important elements of proper setup. We’ve seen many racers who start tweaking, shifting weight, staggering tires, and making many other assorted changes before they’ve even set their cars on the track for the first time. This usually follows an examination of other racers’ cars, with a view to copying some combination of other racers’ setups. The problem with this approach is that you don’t know whether the setup(s) you’re copying will result in a car that handles well or suits your driving style. When you’ve finished, you may have a radically tweaked car, but will it work for you? It’s best to establish the setup that will work for you at the outset, rather than try to copy one that has worked for someone else.

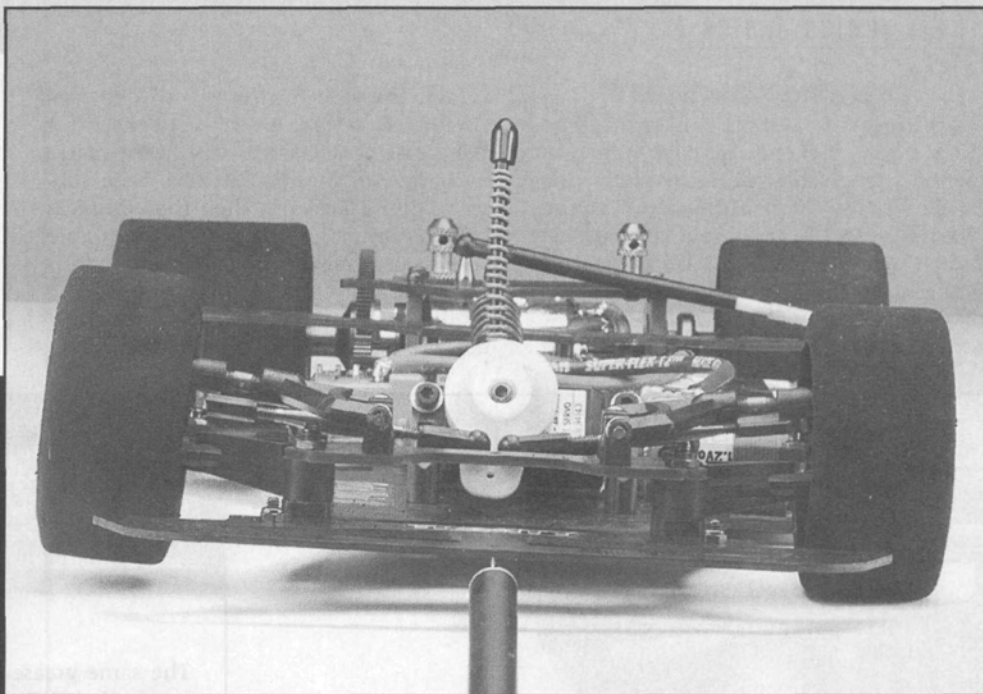
**Set the tweak “flat” for the first run by adjusting the tweak screws or side-spring preload. It can be changed later if necessary, but this will allow the best handling when turning right to correct your line or to avoid an accident.**



## START "FLAT"

We've found that the best starting point with a new car is to make the chassis as "flat" as possible. "Flat" means neutral tweak, equal-size tires, a neutral weight distribution and uniform spring rates for cars with coil-over side dampers or tweak springs. In other words, until you get a chance to tune the car, its right side should be the same as its left, apart from battery placement.

*Checking the tweak/weight distribution is as simple as lifting the chassis at dead center with a hobby knife. The difference in the distance to the ground between the left and right tires is the amount of tweak. This extreme example shows about 1/4 inch of tweak, illustrated by the distance to the ground under the front tire (on the left side of the picture).*



For flat tracks, ride height should be set as low as possible without the chassis scraping the ground ... banked oval tracks require a higher than average ride height

## CASTER SETTING

The caster setting should be the next concern, as this may also affect tire wear and traction. Caster angle primarily affects the car's stability and turning ability. Common practice is to use very little caster on flat tracks and a higher degree of caster on banked tracks. Running less caster provides quicker steering response with a subtle sacrifice of high-speed stability. With more caster, the opposite is true: the car will have more straight-line stability with a subtle loss of steering response. Check the tire wear once again for coning, and make the necessary adjustments to the camber angle so the tires continue to wear flat.

## RIDE HEIGHT

Optimum ride height is another parameter that depends on the track configuration. For flat tracks, ride height should be set as low as possible without the chassis scraping the ground. Cornering forces on a flat track are almost exclusively side loads. These conditions require the lowest center of gravity possible, and this is accomplished by lowering the ride height.

On the other hand, banked oval tracks require a higher than average ride height. When cornering on a high bank, mostly downward Gs act on the chassis, and this requires considerable ride height to prevent the chassis from scraping the track. In either case, it's always best to set the height as low as possible—without scrubbing off speed from chassis contact with the ground.

## CAMBER SETTING

The first few practice runs should be used to determine the front camber settings. Until the camber angle has been properly set, it's difficult to determine other needed adjustments. Tires are the key. A couple of practice runs may make some tire wear visible, but it's best to measure the tires to determine exactly how they're wearing. A common problem in oval racing is that the right front tire wears into a cone shape, and this gives the inside of the tire a larger diameter than the outside. This condition degrades steering response, as such a cone-shaped tire will naturally want to turn right instead of left! The idea is to adjust camber until you get the tires to wear flat. It may take a couple of adjustments to get the proper camber settings, but it will be well worth it in the end.

*The camber setting is very important, as it will affect proper handling and tire wear. Using a camber gauge such as the one made by RPM makes it easier to keep track of camber angle and the number of adjustments.*



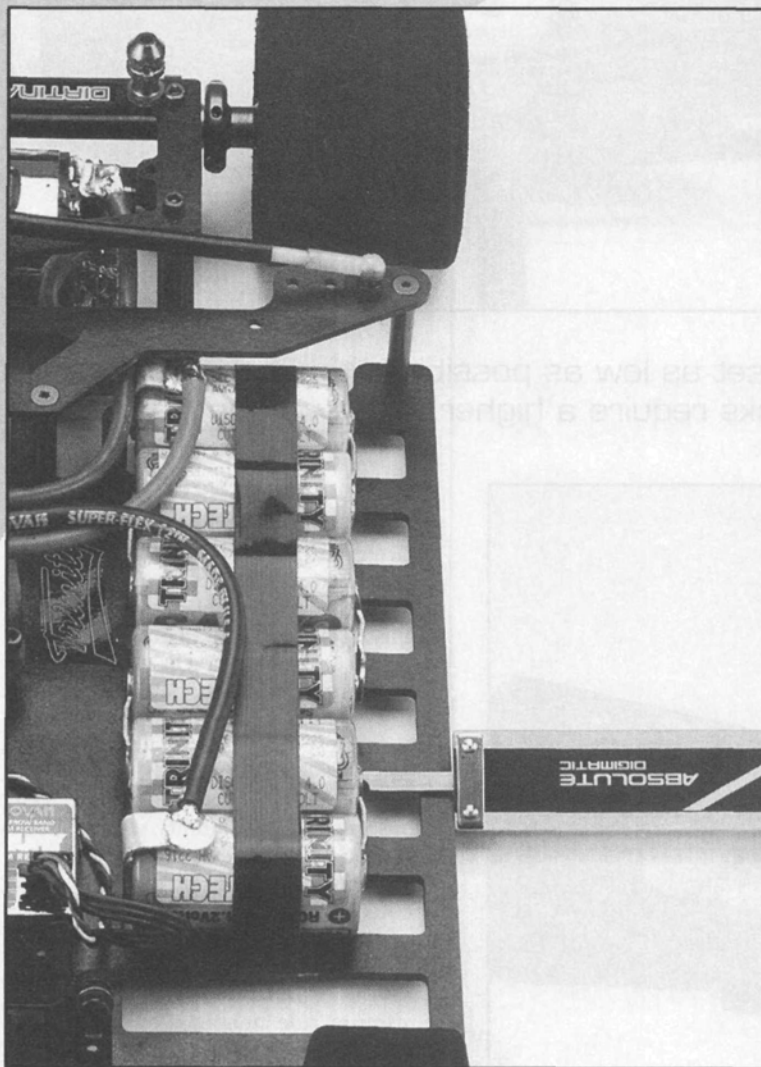
## CHECKING RIDE HEIGHT

A white grease pencil can be used to detect ride height on carpet tracks (asphalt tracks let you know your ride height is low by grinding away at the chassis!). Place a grease-pencil mark on both sides of the chassis from front to back. After a full practice heat, look at the marks to determine how much—if any—rubbed off. If both marks remain fully

intact, the ride height is too high and should be lowered. A very slight erasure of the grease-pencil line is ideal. If the marks on either (or both) sides have been substantially rubbed off, then the chassis is too low and is scrubbing off valuable speed each time it contacts the ground.

Where the chassis is contacting the ground is as important as how much. If the grease-pencil lines indicate the chassis

is rubbing toward the front of the car, then it might be necessary to raise the front of the chassis; likewise, the rear. Avoid using spring preload to adjust the rear ride height, as this will adversely affect handling. Most cars have ride-height adjusters for the rear axle, and these should always be used instead of messing with the spring preload.



*A good way to track weight distribution and its effect on handling is to measure the distance from the battery pack to the edge of the chassis. Be careful not to cause a short circuit by bridging the conductive graphite chassis and the positive end of a cell with a metal caliper or ruler, as this could be quite hazardous.*

## WEIGHT BIAS

The same grease-pencil marks as were used to help determine ride height can also be used to establish proper weight distribution (or "bias"). When the mark on one side of the car shows more contact than the other, it's a good indication that the weight needs to be shifted away from the side that is showing contact with the racing surface. The rule is that high-bank tracks require less weight bias, and flat tracks require more. Tire-wear data can also support what you have gathered from looking at the bottom of the chassis. A car that has more tire wear on the right side requires additional weight bias.

The best method of determining proper weight bias is to start with the battery pack mounted in the innermost position. Or, if you're the type who keeps his throttle pegged until the last possible second, mount the battery toward the middle of the battery slots. Shift the battery toward the outside of the chassis in small increments while you check lap times. You'll know that you've found the ideal position when there is no improvement in performance. As soon as lap times level off, shift the pack back to the previous position; you've found the ideal weight distribution.

**Proper tire choice can often be the most critical element in making an oval car go as fast as possible.**

## SHOCK OIL AND SPRINGS

All experienced racers have their own ideas about which shock oil and spring combinations work best for them. Just knowing how and where to start tuning these items is better than half the battle.

Note the relationship between springs and shock oil. Typically, whenever heavy shock oil is used, a heavy spring should be used and vice versa. A heavier main shock oil/spring combination is effective when running on bumpy track conditions and when running on a banked oval. The higher the degree of banking, the stronger the main spring should be. Heavier shock oil prevents the car from bouncing as a result of the strong spring.

If your car is equipped with side dampers and springs and you are running on a banked oval, you should use medium springs and medium-weight oil. Flat tracks, on the other hand, require quite the opposite. A flat-track setup usually requires stronger side springs or a thicker T-plate. The stronger springs/T-plate keeps the car flatter and helps resist the tendency to roll when cornering flat. The main shock in the same scenario will typically require medium oil and a medium spring.

## TIRES

Proper tire choice can often be the most critical element in making an oval car go as fast as possible.

Choose a compound that's too hard, and the car won't get through the turns properly; it will tend to slide in the front, rear, or at both ends. When there is excessive sliding or "drift," speed is "scrubbed," and your lap times suffer.

If you choose a compound that's too soft, the tires will at the very least offer excessive rolling resistance or, in more extreme cases, possibly cause the car to traction-roll. Other elements such as tire width, diameter and stagger all play a crucial role in obtaining optimum performance, so it's wise to spend a little extra time on this topic.

Two types of tires are generally used in oval racing: foam tires that are used for



any type of carpet oval and flat asphalt oval, and capped or "radial" tires that are used for banked asphalt and concrete oval. Foam tires offer the racer more tuning options where diameter, width and compound are concerned, but capped tires have no equal on the high-speed asphalt and concrete, banked oval tracks. Whichever type of tire is used, note the following universal principles that apply to either type of tire.

## COMPOUND

Use softer compounds for more traction with increased rolling resistance and harder compounds for less traction and less rolling resistance. The problem with the wide variety of available compounds is not knowing where to start, so your best bet is to ask the faster racers which compounds they are using.

The details of your setup may require a different compound from that used by the next racer, but the head start provided by this information will significantly reduce the experimentation and expense involved in choosing your tires.

If you don't have the benefit of an experienced racer to help you with tire selection, apply the following general rules. Harder-compound tires are more suited to banked oval tracks because such tracks require less side bite from the tires. Less traction under acceleration is needed, as banked tracks allow the car to carry more speed through the corners. On the other hand, flat tracks require a significant amount of side bite and traction under acceleration, and such conditions generally require softer compounds.

Tire stagger is the practice of using a larger diameter tire on the outside of the chassis—usually in the rear—to make it easier for the car to turn left



*A caliper is useful for measuring tire stagger and tire wear, both of which have a profound effect on handling. Measure the inside and the outside edges of the tire to determine if any "coning" has occurred.*

## TIRE DIAMETER

The diameter of the tire itself isn't very important, but when using tires of different diameters on the same car, diameter becomes very important. Tire stagger is the practice of using a larger diameter tire on the outside of the chassis—usually in the rear—to make it easier for the car to turn left. This practice makes the car want to turn left all the time but is usually most effective when accelerating, as the larger rear tire tends to push the car to the inside of the turn.

Tires of the same diameter tend to make the car want to go in a straight line under acceleration. Tire stagger is very effective for improving left-turn performance but it's a trick that can make turning right somewhat interesting. Moderation is the key here: cut the inside rear tire a little, for example,  $\frac{1}{32}$

inch, at a time. Check the lap times each time you cut the tire, and stop when the lap times level off or the car becomes difficult to drive.

The diameter of capped tires can't be modified but there will be a noticeable difference in diameter resulting from wear. Always use the worn tire on the inside. If you want to get really tricky, capped tires are available in slightly different diameters from the manufacturer. This gives you the potential benefit of tire stagger with the added bonus of a fresh tire.



*When racing on foam tires, a tire-truing machine such as this one from Hudy Special Products\* is a very valuable tool; it allows quick, precise cutting of the tire for diameter and width.*

## TIRE WIDTH

Flat-track racers rarely benefit from skinny rear tires, as these cars need all the side bite they can get. Cars racing on banked tracks, however, can benefit from a slight reduction in tire width. A narrow rear tire reduces rolling resistance, and when combined with other speed-enhancing secrets, it can make a noticeable difference in speed. Before picking up a harder set of rear tires, try cutting  $\frac{1}{4}$  inch off the inside of the left rear tire, then the right rear tire. Less contact patch will reduce bite, and it will also reduce rolling resistance.

It's hoped that following these tips will eliminate much of the guesswork in setting up your oval car. Exceptions to these general rules exist, but they are sound principles nonetheless. We hope this will make your oval-racing experience a little more enjoyable—and faster, too!



# Tuning Terms

**Camber:** the angle of the kingpin when viewing the car from front to back. The camber angle is typically adjusted to maximize the front tires' contact patch and to improve tire wear. A negative camber angle results in the top of the kingpin tilting inward toward the chassis; a positive camber angle tilts the kingpin outward.

**Capped tires:** the same as "radial" tires; these have a solid rubber cap covering a foam core. They are primarily used for concrete banked and asphalt oval tracks and offer a significant reduction in rolling resistance for greater speed. Capped tires have much less side bite, and this makes them less suitable than standard foam tires for flatter tracks.

**Caster:** the angle of the kingpin when viewing the car from the side. The caster angle is adjusted to change steering response and straight-line stability to suit track conditions. A positive camber angle results in the kingpin tilting toward the back of the car, while a negative angle tilts the kingpin toward the front. A lower degree of positive camber improves steering response, but there's a subtle loss of high-speed stability. A higher degree of caster angle improves high-speed stability, but there's a subtle loss of steering response. Negative caster is almost never used.

**Coning:** used to describe a tire wear pattern that results from poor camber angle adjustment. When camber angle isn't properly adjusted, the front tires are at an angle to the racing surface, and this results in more wear on one side of the tire that makes it look like a "cone."

**Oil dampers:** the same as shocks. Oil dampers are typically filled with oil to damp vibration and shock from the racing surface.

**Damper tubes:** unlike oil dampers, these use the friction of a viscous lube to dampen vibration and shock; they are typically used instead of oil dampers to dampen side-to-side motion of the rear pod. These very simple dampers are easy to maintain but require more frequent maintenance; otherwise, they may perform less consistently than oil dampers.

**Kingpin:** connects the steering block to the front suspension and serves as a pivot or hinge pin for steering.

**Oversteer:** a condition in which the car steers more than it should, usually as a result of a poor chassis setup that allows excessive rear-tire slippage when cornering. When the rear tires slip, the rear of the car swings to the outside of the turn, and this points the car farther toward the inside of the turn than was intended.

**Pod:** the assembly at the rear of the chassis that houses the motor and the rear axle and serves as a mount for one or more dampers. The pod is connected to the chassis with a T-plate or some other form of pivot plate; this allows limited movement for suspension purposes.

# At-a-Glance Troubleshooting Guide

CONDITION	CAUSE	CURE
Not enough steering	Hard front-tire compound Tires are dry Poor setup Insufficient spring tension/preload Strong front springs Too much caster Too much rear bite Long wheelbase Too much rear downforce Insufficient front downforce No tire stagger	Softer compound Apply traction compound Add right tweak Stronger rear main spring/more preload Softer front springs Reduce caster angle Harder compound/narrow tires Use shorter wheelbase Move wing forward/shorten spoiler Mount body farther forward Cut diameter of left rear tire
Too much steering	Soft front-tire compound Too much traction compound Poor setup Too much spring tension/preload Soft front springs Not enough caster Not enough rear bite Short wheelbase Not enough rear downforce Too much front downforce Too much tire stagger	Harder compound Apply less traction compound Add left tweak Softer rear main spring/less preload Harder front springs Increase caster angle Softer compound/wider tires Use longer wheelbase Move wing back/taller spoiler Mount body farther back Use tires of same diameter
Inside front tire lifts in corner	Poor weight distribution Weak side spring(s) Soft side damping Poor tweak setting	Move battery to the left Thicker T-plate/more side spring tension Thicker shock oil in side springs Add right tweak
Not enough speed	Tire scrub Chassis bottoming Poor gear mesh Body rubbing Too much rolling resistance	Understeer (see "Not enough steering") Raise ride height/stronger main spring Set correct gear lash Ensure proper tire/ground clearance Harder/narrow tires
Tires wear on one side	Poor weight distribution	Move weight away from worn tires
Front tires wear in cone shape	Poor camber setting	Adjust camber until tires wear flat
Car slides sideways through turns	Hard compound tires Dry tires	Use softer compound Use traction compound
Chassis bottoms out	Ride height too low  Insufficient damping Insufficient main spring tension	Raise ride height with adjusters (not spring preload) Use thicker shock oil Use stronger main spring
Car bounces over bumps	Too much spring preload Insufficient damping	Reduce preload Use thicker shock oil

**Rollout:** a calculation of the distance a car will travel for a single motor revolution. The following equation is used for calculating rollout:

$$\text{(tire diameter} \times 3.14) \text{ divided by (pinion divided by spur) = rollout.}$$

For example, if your tires measure 2.5 inches in diameter, multiply that figure by 3.14 (pi) = 7.85. Now, divide the result of the first equation by your gear ratio. If you're running a 120-tooth spur and a 32-tooth pinion (120 divided by 32), you'd have a 3.75:1 gear ratio; 7.85 divided by 3.75 = 2.09 rollout, or 2.09 inches of forward travel for every motor rotation.

**Scrubbing:** poor handling causes scrubbing, mostly when a car is pushing (same as understeer). If the car isn't turning as much as the front wheels are trying to make it turn, then the front wheels are being pushed sideways to a certain degree. When the wheels aren't pointed in the same direction as the car, it "scrubs off" speed.

**Stagger:** a subtle difference in tire diameter from one side of the car to the other—intentional or otherwise—is referred to as stagger. It's common to run a slightly smaller tire on the inside rear (and sometimes in the front) to improve cornering. If, for example, you're using a 2.5-inch-diameter tire on the right rear, and a 2.25-inch tire on the left rear, that equals .25 or 1/4-inch stagger.

**T-plate:** an integral part of the rear suspension, the T-plate is available in a variety of materials and configurations. It can serve simply as a pivot and attaching point for the rear pod, and it can also be employed to provide spring for suspension movement in all directions.

**Tweak:** the setup, or relationship, of the chassis to the racing surface is referred to as "tweak" or "wedge." A chassis that is configured to place equal amounts of pressure on each tire for balanced handling is considered to have a "flat" or "neutral" tweak. A truly tweaked chassis, on the other hand, will intentionally

include an imbalance for the purpose of fine-tuning a car's left-turn characteristics. A car is tweaked by adjusting the tweak screws in the T-plate, the springs on the side dampers, or the tweak springs that have come into vogue on some of the newer oval cars. By tightening the tweak screw on the right side of a T-plate car, for example, additional pressure is put on the left rear and right front tires; this creates a condition that softens steering response.

**Understeer:** a car that tends to want to go in a straight line, even though its front wheels are turned, is referred to as having "understeer" or "push." This condition can be caused by a number of factors (see the "Troubleshooting" sidebar), none of which are desirable in extreme cases. A mild amount of understeer creates a sense of stability, but when this condition reaches extreme proportions, it can cause an unacceptable loss of speed.

*\*Addresses are listed alphabetically in the Index of Manufacturers on page 209. ■*

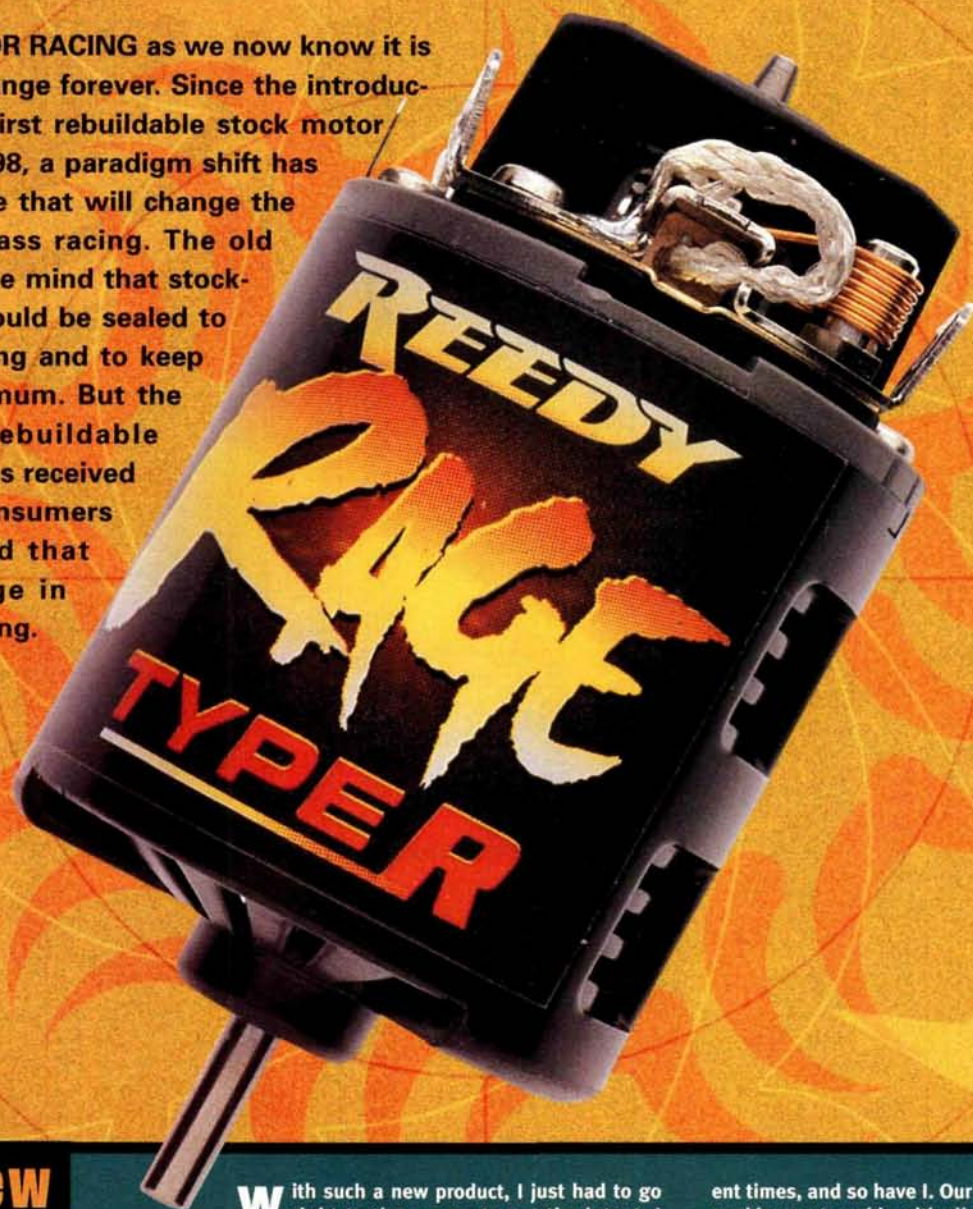


REEDY RAGE TYPE-R

# Inside Reedy's Rebuildable Stocker

by Steve Pond

**S**TOCK-MOTOR RACING as we now know it is about to change forever. Since the introduction of the first rebuildable stock motor at the end of 1998, a paradigm shift has taken place—one that will change the face of stock-class racing. The old school was of the mind that stock-class motors should be sealed to prevent tampering and to keep costs to a minimum. But the new class of rebuildable stock motors was received very well by consumers and racers, and that forced a change in traditional thinking.



PHOTOS BY WALTER SIDAS

## interview

### REEDY IS READY!

**W**ith such a new product, I just had to go right to the source to get the latest. I thank Mike Reedy for taking time out of his busy schedule to talk to me.

*Steve Pond: What is your relationship with Yokomo and Sagami as far as it relates to motor development?*

**Mike Reedy:** It's a three-way partnership. Through the years, there have been a lot of times when Sagami has come up with ideas and I tested them and worked out the details. Yokomo has come up with ideas at differ-

ent times, and so have I. Our latest motor came from a working partnership with all three of us.

*SP: What was your role in the development of the Rage 24 motor?*

**MR:** Mostly the testing and the going back and saying "It doesn't quite meet what I want," and I just kept working on it.

*SP: Will the new motor be available to other companies, and if it will, which will sell it under their label?*



These new motors take the concept of stock-motor maintenance to new levels. They allow the same access as is enjoyed by the modified-motor crowd while it institutes tamper-proofing measures that make it even more secure than its stock-class predecessors.

The reaction from consumers and racers has been largely positive. In the States, both of the major race-sanctioning organizations have given the motor their stamp of approval as a result of its growing support, and by July 1, 1999, rebuildable stock motors in ROAR- and NORRCA-sanctioned racing will be a reality.

The introduction of the Reedy® Rage Type-R rebuildable stock motor now marks the participation of both of this country's largest OEM suppliers in the rebuildable stock motor market. Though the Reedy Rage is built in a Yokomo can, Mike Reedy of Reedy Motors does more than just stick a label on it; he has long been a pivotal figure in the design of most of the motors built for Yokomo.

The Type-R, which includes modifications necessary to remove the endbell for motor maintenance, is a rebuildable version of the recently introduced standard Reedy Rage 24. Though both motors have similar features, it's clearly the Type-R that racers are clamoring for, so that is the subject of this in-depth feature.

The Rage is a new design that replaces the Firehawk—a somewhat dated design that was not able to keep up with the latest generation of stock motors in competitive racing circles. The new Rage includes all of the same performance-enhancing technology as the hottest stock motors on the market—features that will surely make it a contender at the higher levels of stock competition.

## FEATURES

• **Motor can.** The Rage motors use 1.4mm-thick material for the can, which is machined inside and out for uniform thickness. Both sides of the can feature indented vents that help keep the motor cooler and hold the magnets in place. Using the vents instead of the old metal shims to align and hold the magnets makes magnet placement more precise and secure and is supposed to optimize the magnetic field. The magnets are referred to as the 5.2z high-temperature



variety, but the lack of standardized magnet ratings makes this information less than useful except when comparing motors in the Reedy/Yokomo line. The bottom of the can has also been opened with additional vents to further ensure that the motor gets as much cooling air as possible. Finally, there is a notch where the endbell mates with the can to index the endbell to 24 degrees of timing.

• **Endbell.** The endbell is composed of a glass-filled composite material that adds strength and makes it more resistant to heat. Black heat sinks on the endbell maximize heat dissipation and further reduce the potential for heat damage to the endbell under extreme conditions.

The Rage features laydown brush hoods and, depending on the model, includes Reedy 767 full serrated or 769 cavity serrated brushes. The brushes are held in place with a vibration-damping system that prevents them from bouncing around in the brush hood.

• **Armature.** The Rage motor includes the new "3HL" dual-rotor armature that is the central point of what makes the Rage such a potent performer compared with the old Firehawk. The 3HL armature features a precision-trued commutator that is roughly 0.310 inch in diameter. The comm can be cut down as far as 0.270 inch before the comm material gets dangerously thin. In keeping with current ROAR stock rules, the comm is locked to the stacks, or laminations, to prevent users from tweaking the timing.

The stacks break new ground for Reedy/Yokomo motors. The laminations are made of high-grade silicon steel, but the true technology isn't entirely revealed until the windings have been removed. A pair of holes is drilled lengthwise through each pole of the armature—one through

the center of the web and another slightly off-center through the crown. This is done to alter the flux path through the armature, and this essentially makes the motor run as though it has more advanced timing. Finally, the 3HL armature is held together with a 0.125-inch shaft that has a tapered end on the commutator side for positive identification as the proper armature for the motor.

## TESTING

Now that all the technical mumbo jumbo has been exposed, the question on everyone's mind is, "How does it run." Instead of giving vague driving impressions such as, "It definitely feels faster," or "It feels like it has more punch," I ran no less than 100 tests on different samples of Reedy's Rage 24 Type-R using a Robitronic Pro Master dyno. This provides rock-solid performance info on the strengths and weaknesses of this new motor and how to optimally tune and race it.

The model used for testing is Reedy's Rage 24 Type-R Plus: it's a high-performance unit using high-quality springs, better-quality brushes and a re-trued commutator—all in the name of optimum performance. Initial tests of the Rage revealed maximum power output at between 115 and 125 watts and torque in the low 80Nmm range. Through exhaustive testing, I was able to generate consistently higher power output numbers in the 130W to 132W ranges with torque readings of between 90 and 93Nmm.

The Type-R's obvious strong point is that it produces more power than any previous Reedy/Yokomo stock motor. The Type-R Plus comes equipped with Reedy's 769 cavity-type brush and a pair of heavy copper springs. Tests straight from the box reveal a high-revving motor that produces good maximum power but lacks low-speed torque. Through a process of testing many brush and spring combinations, I determined that the best overall setup is to use Trinity's no. 4499 laydown silver serrated brushes with green, 11-ounce springs. This combination produces maximum power output in the low 130W range and torque in the low 90Nmm (Newton millimeter) range.

The dyno graph illustrates how the Rage develops power. The solid line is the Rage Type-R, and the dotted line is a

**MR:** All my products are available to other manufacturers and have been through the years. This motor right now will be sold under the Phantom label, and I believe Litespeed and Team Orion also plan to use it.... It's still too new to know exactly who will be using it, but time will tell.

**SP:** What's your general opinion of rebuildable stock motors, and how do you think it will affect racing?

**MR:** When the concept originally came up, I was

against it. I'm warming up to the idea, obviously, but to some degree, I'm still against it because I think stock should be simple and non-technical—a place for entry-level drivers. The rebuildable motor does offer people who don't quite want to run modified but aren't beginners a class in which they can race, so I can see why it's popular. What I would like to see, however, is another class for people who are just getting started in racing where they don't need to have motor-rebuilding skills just to be competitive. A more simple class would

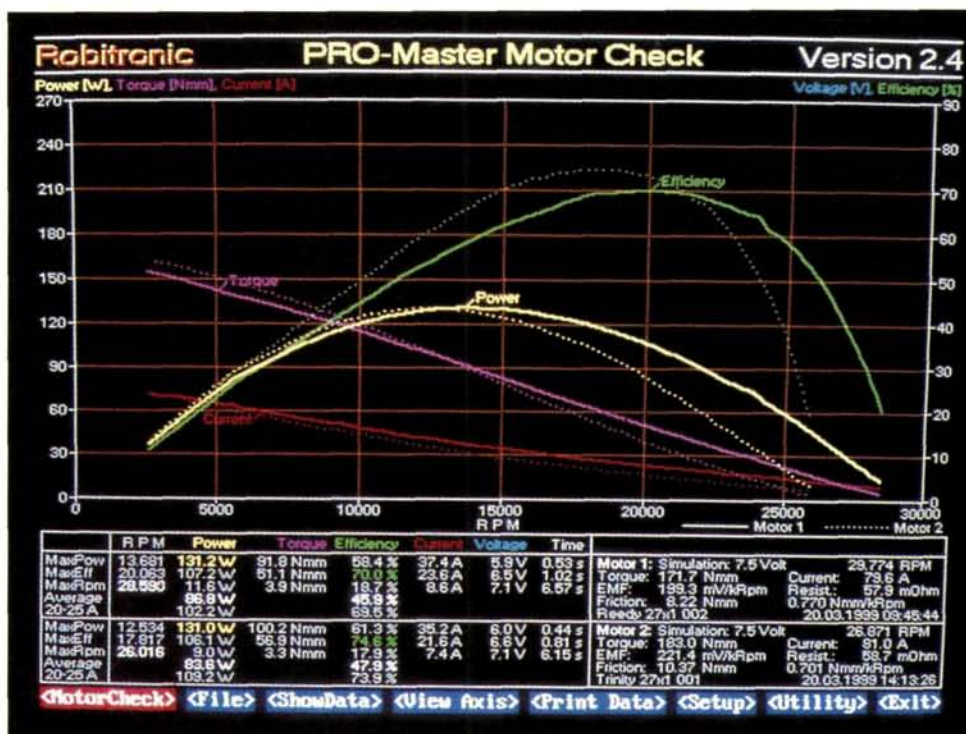
make it easier to get first-time racers involved. There will always be an opportunity to learn and work up to the other classes later, but I think we generally need to make it easier for first-time racers to get involved without being intimidated.

**SP:** Do you think that would be an appropriate forum for the 5-degree motor?

**MR:** Yes, I do.

*continued on page 182*





This graph from a Robitronic dyno reveals that the Rage (solid line) has less start-up torque than the Paradox (dotted line), but it pulls about 2,500rpm more and has more high-speed torque. The Rage's late power delivery means that on the average track, you need to drop some teeth on the pinion to get some torque out of the corners; but give it some room to breathe, and it will really scream!

Paradox Pro. Though their maximum power ratings are virtually identical, the Rage peaks at 1,150rpm higher.

- The Rage's strong points: very good peak power and good high-speed torque, and it's capable of reaching higher rpm than any other stock motor.
- Weak points: less low-speed torque and less low-speed efficiency.

The common denominator of the strong points is high speed. It develops maximum power at 13,681rpm and maximum efficiency at 20,063rpm. Conversely, the Rage's weaker characteristics show up at low speeds. The result is that:

- The motor likes to breathe, so it would be wise to let it rev a little more than the average stock motor.
- Regardless of what you do for your

setup, it looks as if the Rage is better suited to higher speed applications like fast roadcourses, long and hard-packed off-road courses and oval racing.

- It's capable of turning about 2,500 to 3,000 more rpm than average under load.
- It makes better torque at high speed.
- It develops more high-



Engraved on the can is zero-degree mark that lines up with the 24-degree mark on the endbell. Each endbell mark indicates 12 degrees of timing.

speed horsepower than the average stock motor.

All of these factors will require a change in gear ratio compared with other stock motors to keep pace on the average track. The overly technical way to determine gearing is to calculate the difference in rpm at peak power between the Rage and your previous motor as a percentage then reduce the rollout by that amount.



A tab on the endbell is indexed to the can to lock timing at 24 degrees. The tab could be cut and the timing advanced, but there are visual ways to detect timing tampering.

continued from page 181

SP: Can you offer any Rage tuning tips for specific types of racing?

MR: Yes,  $\frac{1}{12}$  scale. I like to cut a little off the brushes on the leading and trailing edges so there isn't quite as much overlap on the commutator segments. For  $\frac{1}{10}$  scale or four- or five-minute racing, that isn't necessary and would actually take away a little of the power, but it appears to improve efficiency for the long  $\frac{1}{12}$  races. Brush-wise, I'd recommend, in  $\frac{1}{12}$  scale, almost any on-road racing and 2WD that you run a brush either with a cavity or a slot in it. For 4WD or truck, you'd need more torque and more surface area, so I'd run a full brush.

SP: What about springs?

MR: Springs, I go light on the negative side and heavy on the positive side. I tend to run a little heavier than most people. I think if you use a normal  $\frac{1}{12}$ -scale spring on your  $\frac{1}{12}$ -scale and  $\frac{1}{10}$ -scale on-road cars, that would be good. I'd recommend a heavier modified-class spring—off-road spring—for running 2WD buggy, truck and touring car.

SP: Mike, thanks for your time, and good luck with the Rage Type-R.

MR: Thank you.



The new double-rotor armature in the Rage Type-R features a pair of holes drilled lengthwise through each pole—one through the center of the web and another slightly off-center through the crown. This alters the flux path and makes the motor run as though it has more advanced timing.

The easier method is to drop 1 to 2 teeth on the pinion for direct drive, 2 to 3 teeth for buggy and touring car and up to 4 teeth in truck applications, and you should be in the ballpark.

## CONCLUSION

The Rage 24 Type-R is an excellent motor; it just runs a little differently from what most of us are used to with stock motors. It favors applications that let a motor rev a little higher. I'm not implying that the Rage isn't suitable for low-speed applications; you just need to change the gearing to exact maximum performance. But give the Rage a little breathing room, and I don't think there's another stock motor that will keep up with it!

\*The addresses of the companies featured in this Guide are listed in the Index of Manufacturers on page 209.



## Tuning and Modifying the

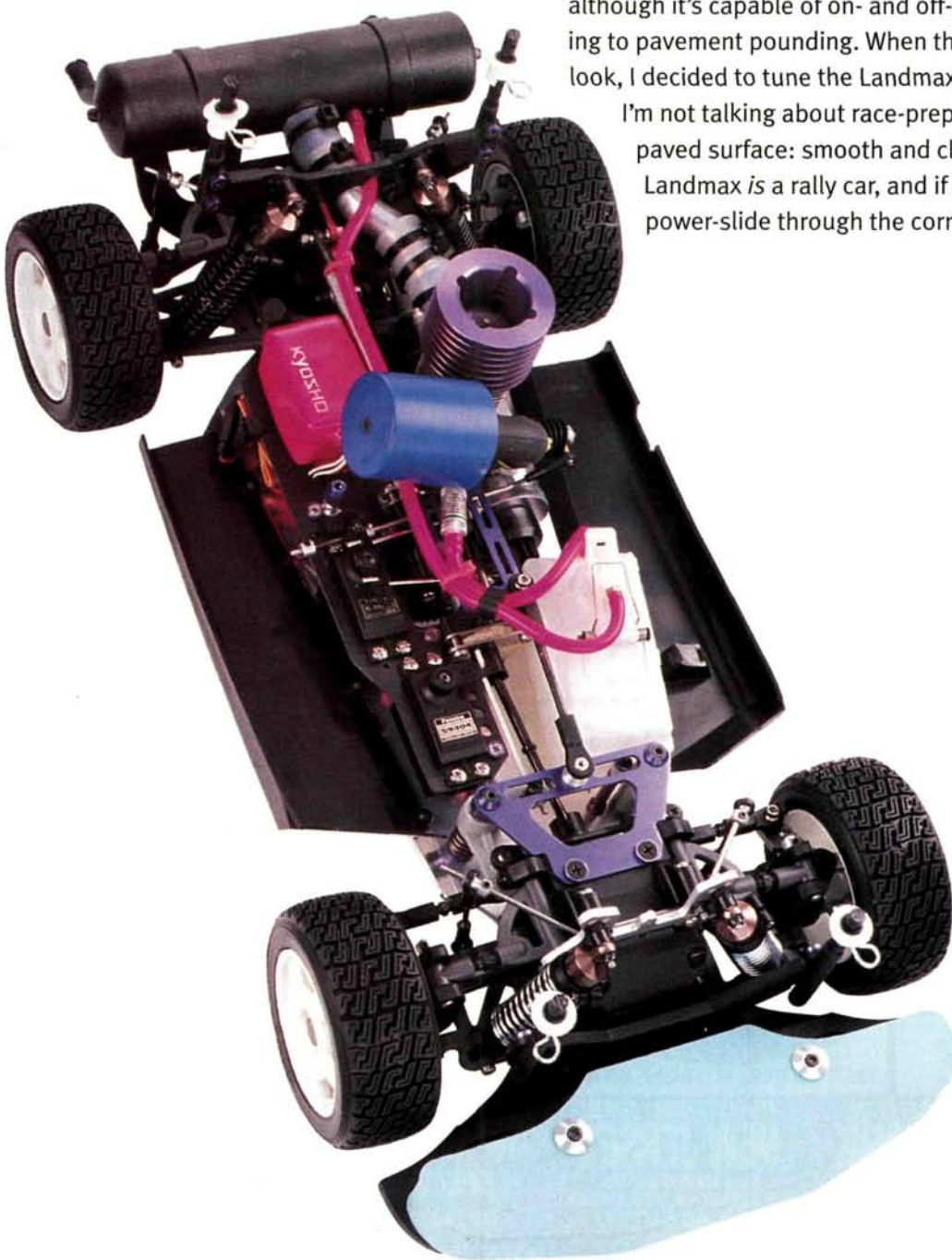
by Doug Huse

# Kyosho Landmax



I have run my Kyosho\* Super Eight Landmax for about a year now, and although it's capable of on- and off-road action, I have found myself sticking to pavement pounding. When the editors asked me to take a second look, I decided to tune the Landmax for better handling as a "tarmac" car.

I'm not talking about race-prepared surfaces here, but rather, *any* paved surface: smooth and clean or rough and dirty! After all, the Landmax is a rally car, and if you can't kick up a little sand or power-slide through the corners, then what's the point?



## PARTS LIST

### KYOSHO

- Dual muffler set—part no. GT-2.
- Straight manifold—SGT-7.
- Tailpipes (2)—FD-33.
- Front bumper—GT-17.
- Urethane foam bumper—39401.
- 2-speed transmission—GT-30.
- Universal swing shaft—GTW-1.
- Special tie rod—GTW-2.
- Special upper rod—GTW-3.
- Rear stabilizer set—BS-63.
- Big Pressure shocks (F/R)—BSW-27/BSW-28.
- Special brake disk—BSW-52.
- Special radio post—BSW-54.
- Front stabilizer—BSW-79.
- Special Unicrank—BSW-86.
- Antenna holder—1710.
- O-rings (10)—BS-74.
- 30,000WT diff lube—96505.

### DURATRAX

- Rear chassis brace—DTXC2571.
- Graphite radio tray—DTXC2510.

## SETUP

### FRONT SUSPENSION

- Shocks
  - medium piston
  - silver (soft) springs
  - 30WT oil
  - 1 degree negative camber
  - 0 degree toe-in/out

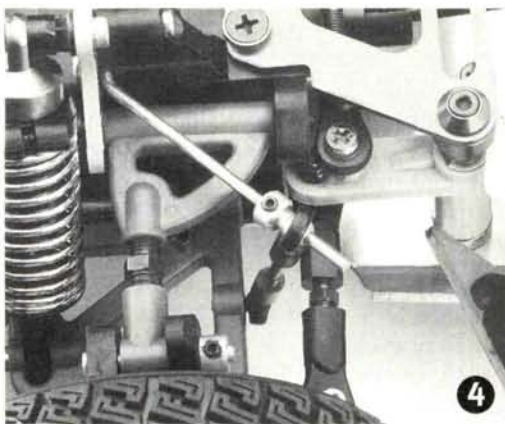
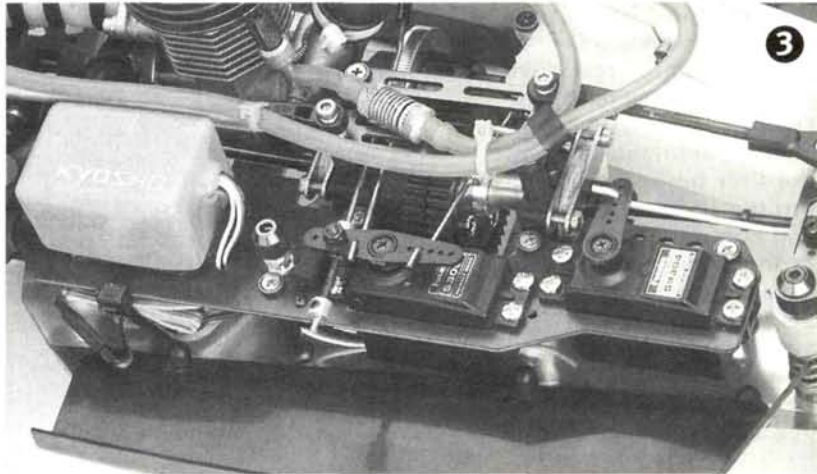
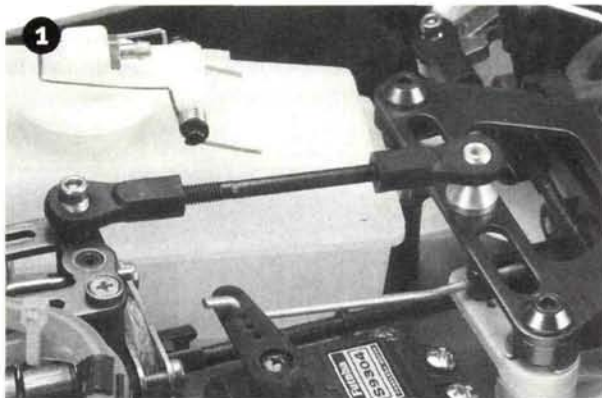
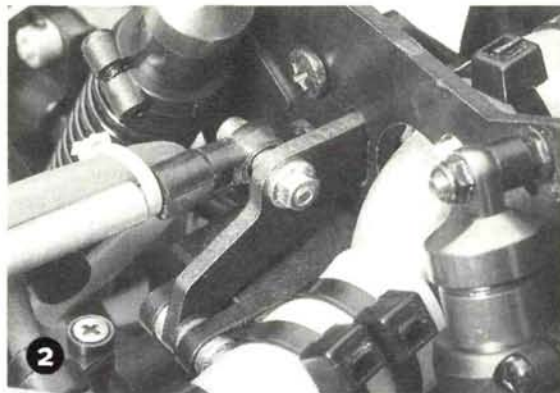
### REAR SUSPENSION

- Shocks
  - hard pistons
  - black (medium) springs
  - 40WT oil
  - 1 degree negative camber



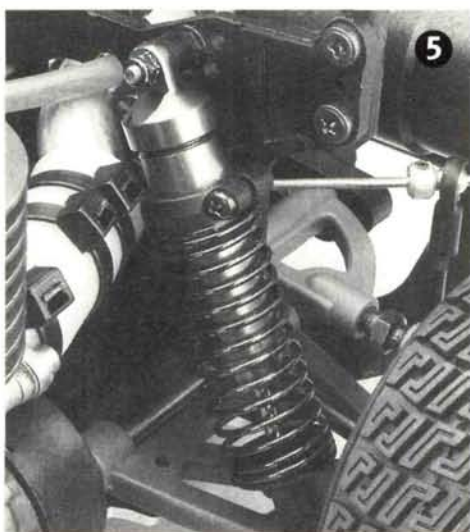
## CHASSIS

The first order of business was to stiffen the chassis. I installed Kyosho's front torque-rod kit for the MP-5 **1**, but I attached the rear of it to the center diff housing instead of to the chassis plate. A DuraTrax\* rear chassis-brace kit **2** stiffened things up out back. The rear brace kit was originally designed for the Turbo Inferno, so I had to cut a slot in the rear shock tower to install it. I replaced the radio tray with a DuraTrax graphite unit **3** supported by Kyosho's purple-anodized radio posts; this combination should eliminate any tray flexing during heavy steering or braking. To help protect the body and front suspension, I added an oversize front bumper and urethane foam.



## SUSPENSION AND STEERING

I replaced the stock threaded upper camber links with turnbuckles **4**, and I added stabilizer bars to the front and rear to help keep chassis roll to a minimum. I replaced the shocks with Kyosho's Big Pressure aluminum large-body shocks **5**. Though the plastic shocks performed adequately, the aluminum hop-up units are certain to outlast the stock pieces, and they look a lot more "serious." The Big Pressure shocks include three pairs of pistons and springs, and this will permit you to match damping and spring rate to your handling preferences. The lower arms came with ride-height adjusters, which I used to lower the entire chassis about 1/4 inch for a more aggressive stance. The steering was upgraded with Kyosho's supersmooth, ball-bearing-supported special Unicrank steering and turnbuckle tie rods **6**. The Unicrank isn't cheap, but it works wonders for steering precision when it's coupled with an appropriately powerful steering servo.

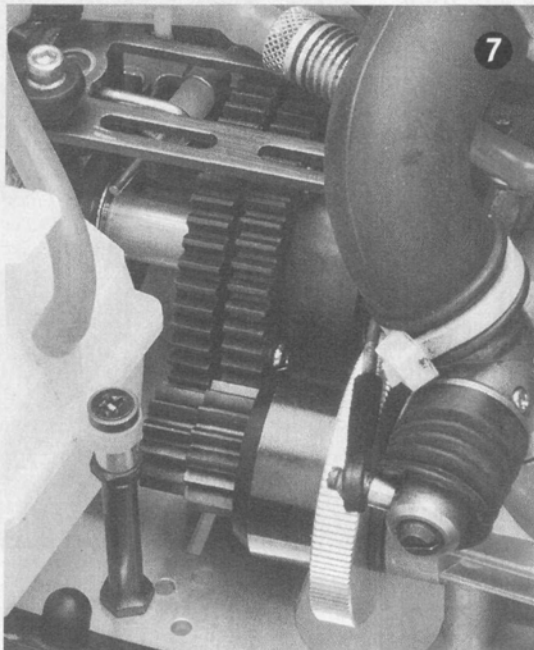




## DRIVELINE

Given my pavement-pounding plans for the car, the obvious first step in the driveline was to add a 2-speed tranny. If you decide to do the same, keep in mind that dirt and jumps are extremely detrimental to its inner workings and must be considered off-limits. When you install the GT-30 2-speed ⑦ in the Landmax, put the included drive shaft in the front of the car with one BS-74 O-ring inserted in the front drive cup of the 2-speed; the shaft you removed from the front must be installed in the rear with two O-rings inserted into the rear drive cup. If you forget to use the O-rings, you will be instantly reminded of them the first time you hit the throttle because the shaft will come flying out. The Landmax's engine-cooling fan cannot be used with the 2-speed, so I removed it and cut large ventilation openings in the Impreza body's front and rear windows.

Given the higher top speeds attainable with the 2-speed tranny, I felt that a brake upgrade was in order. I replaced the stock

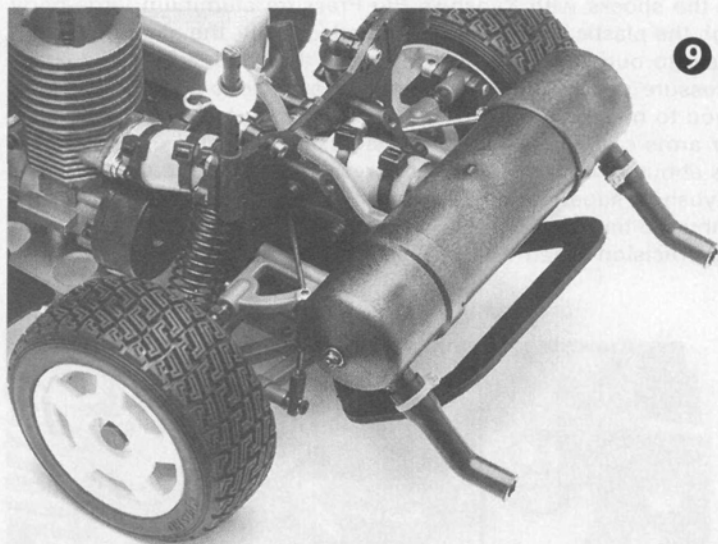
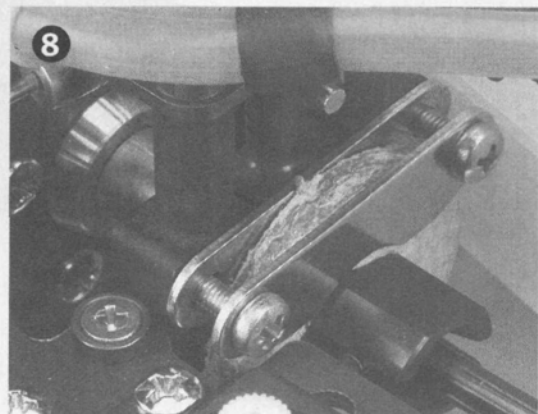


plastic disks with a pair of fiber units ⑧. My SuperTen stops great with just one of these, and two are more than adequate for the Max.

The only change I made to the diffs was to add 30,000WT diff lube to the rear. This will slow the diff action and help prevent "unloading."

I installed a set of universal axles in the front and rear to distribute power to the wheels, and last, I canned the included bushings in the axle carriers and replaced them with a set of Dynamite\* Red Seal bearings.

Since Kyosho's stock rally wheels and tires have proven quite capable on clean and dirty pavement, I left them in place.



## EXHAUST

OK; I know I'll get some flak for this, but after I had finished detailing my new Subaru body, I could not stand to cut a hole in its side for a tuned pipe. Instead, I chose to use Kyosho's dual-outlet, scale muffler system ⑨. It might not be as efficient as a pipe, but hey, this is my car, and I think it looks cool!

## PERFORMANCE

Stock out of the box, the Landmax is big and bad, and it surely is fast. The addition of the 2-speed doesn't make it any bigger—just a lot badder and faster; in fact, ballistic! In first gear, it rips away from a dead stop; when second kicks in ... fuhgeddaboutit! It's outta here! The changes to the suspension have proven to be a real improvement for pavement use. Because of the car's stock high stance, I was worried it might roll during aggressive cornering; with the new lower setup, the car was planted. Adding swaybars and lowering the ride height kept chassis roll to a minimum and gave a much more stable feel. When under heavy power, it exhibited a bit of a push but not enough to warrant any changes in setup. I would rather have a push than have the car looping

all the time. The braking system works great and shows no sign of fade or wear. The fiber disks grip much better than the plastic, so expect to have to dial out a bit of brake to prevent the wheels from locking up.

If you decide to take the improved version of the Landmax off-road, I highly recommend that you remove the 2-speed and opt for the original center diff. You might also want to soften up the front end by using MIP\* soft springs (or Kyosho springs, if you go the "Big Pressure" route).

I would have to call the Landmax the perfect "run anywhere" car; it has just the right amount of off-road toughness and on-road finesse—a great mix for those not-so-perfect parking lots.

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 90409-5680; (310) 775-6435;  
 fax (310) 472-4870;  
 website: www.acerracing.com.

**Aero-Car Technology**  
 P.O. Box 336, Western Springs, IL  
 60558-0336; (708) 246-9027.

**Associated Electrics**  
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 CA 92626-1403; (714) 850-9342;  
 fax (714) 850-1744;  
 www.rc10.com; www.team  
 associated.com.

**Cirrus**  
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**CRC (Calandra Racing Concepts)**  
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**Futaba Corp. of America**  
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 (800) 682-8948;  
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**Hammad Ghuman Inc. (HG)**  
 6 Tower Heights, Albany, NY  
 12211; (518) 782-9255;  
 fax (518) 782-9256;  
 website www.1hg.com.

**Hitec RCD**  
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 Santee, CA 92071-2854; (619)  
 258-4940; fax (619) 449-1002;  
 website: www.hitecrd.com.

**HPI**  
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 Irvine, CA 92618; (949) 753-1099;  
 fax (949) 753-1098;  
 website: www.hpiracing.com.

**Hudy Special Products (HSP)**  
 distributed by Serpent Inc. USA  
 (address below).

**Irrgang Racing Service (IRS)**  
 18 Cannon Rd.,  
 Milway, NJ 08340;  
 phone/fax (609) 476-2371.

**JR Racing**  
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 IL 61821; (217) 355-9511.

**Kimrough Products**, 1322 Bell  
 Ave., Unit 1-C, Tustin, CA 92780;  
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**KO Propo**  
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 fax (626) 966-2901;  
 website: www.miponline.com.

**Mugen Seiki Racing Ltd.**  
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 website: www.niftech.com.

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 fax (314) 531-5678.

**Reedy Modifieds/  
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**Savon Hobbies**  
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**Schumacher USA**  
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 website: www.racing-cars.com.

**Serpent Inc. USA**  
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 website: www.tekin.com.

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 website: www.teamtrinity.com.

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# Chris's BACK LOT

## The Unwanted Racer

The opinions expressed on this page do not necessarily represent the opinions of the entire Car Action staff. Any resemblance to reality is purely coincidental. Send your correspondence, hate mail, love letters, photographs—anything you like—to Chris's Back Lot, c/o R/C Car Action, 100 East Ridge, Ridgefield, CT 06877-4606. My email address is: [chris@airage.com](mailto:chris@airage.com).

BY CHRIS CHIANELLI

Dear Chris,

I have run into sort of a problem here with a lot of the other drivers. You see, last year, after six months of trying, I landed Xipp as a sponsor. I run all of their stuff and started winning a lot of races with it; and I do mean a lot. Just four months ago, I picked up Tekin and Robinson Racing as sponsors as well. Life has been good to me ... until now.

See, I'm the only locally sponsored driver, and I think I'm hated because of it. Some of my friends have told me about the other drivers talking trash about me, and I do mean trash.

Every September, we all go to a race called the "Pizza Fest" in Denver. This year, I TQ'd and won in 4WD and was 0.0217 second off TQ in stock but won anyway. I was really happy, especially when I found out that I did better than anyone from our track had ever done in Denver. A lot of people were talking about that, though, and not in good words.

I try to help everyone who asks and make sure they all have winning setups or good motors, or the right tires or the right gearing, but it doesn't mean a thing to them when another driver comes along and says I'm wrong; go figure.

What do I have to do to get a little respect?

Drop all that I have worked so hard for?

Stop racing? Don't talk to anyone, or help anyone? What's an unwanted driver to do?

**JEFF**  
aka "The Unwanted  
Racer"



ILLUSTRATION BY PETER VIERA

Dear "Unwanted,"

*Jealousy: one of the three worst human weaknesses. (The other two are subjects for another magazine.)*

*When your ability stands out in a crowd, there will always, always! be those who become so jealous that they can't handle it. The truth is that you're a talented driver, and some—not all—of your friends can't handle the truth. I'm sure, though, that a few of them are happy for you. Stick with them; they are your true friends. Forget the rest.*

*I'm sure you thought that some of those who turned on you were your friends; well, guess what? They weren't. You've just learned an important lesson in life. And from here on in, you'll more easily be able to tell your good friends from the jealous, sniveling, "Dawson's Creek"-watching slug-boys who cry into their pillows every night because they can't drive like you.*

*I really do know what you're going through; I have a cool job, and people occasionally take shots at me because of it. In a way, though, I love it. Maybe my success reminds them of what poo-poo-head, can't-get-a-date Howdy-Doody boys they really are, so they have to lash out at me. They're actually paying me a compliment—and they're too stupid to realize it! I never waste my time even thinking about it. Guys like that are good entertainment and make me feel lucky for what I have; you should feel the same.*

*Enjoy what you have, Jeff, and don't let other sad little "wimplings" ruin it for you. Deny those worms their nasty little victory. Keep right on winning and helping others less experienced than you; it's the right thing to do!*

CC



### beanie racers

Everyone should have two!

Check this one out: Beanie Racers. Now there's a stroke of pure moron-genius. I'm not kidding: they really pay those marketing yuppies to come up with this stuff. Can't you just see it now? The morning paper's headline reads: "Jeff Gordon and Dale Earnhardt get into fistfight at Toddlerville Toy Store over the last Rusty, the Fuzzy Ford."